



NORTH AMERICAN WILD FLOWERS

1. Violet. 2. Wake robin. 3. Fringed gentian. 4. Day lily. 5. Smooth rose. 6. Lady's slipper. 7. Marsh marigold. 8. Jack in the pulpit. 9. Phlox.

COMPLETE

AUTHORITATIVE

PRACTICAL

THE UNIVERSAL ENCYCLOPEDIA

**A COMPREHENSIVE
REFERENCE BOOK**

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AUTHORITIES ON SPECIAL SUBJECTS

In Six Volumes

**ILLUSTRATED WITH COLORED PLATES
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PREFACE

Success today comes first to those who are best prepared to take advantage of all opportunities as they offer, and to those who have the best practical education. Recognizing this, and realizing that *self-help* is in all cases the *best help*, and *home instruction* often the *best instruction*, publishers of recent years have been deluging the world with books of ready reference—dictionaries, encyclopedias, compendiums, and works under varied titles—all intended for the one important end of supplying this earnest demand of the people at large. In these days of active thought and busy enterprise, to live without an encyclopedia of information is to pass through life seriously handicapped.

To keep up with the race of events today, one must be equipped with the best possible means of progress, and of these means, the best are books—books of reference, of information, of ways and means, of figures and facts, arranged in simple, convenient form, and covering every department of knowledge.

We must *keep gathering knowledge* or we will *stagnate*. We must fill our minds with information, ready to grasp opportunity as it flies. And yet no man, no matter how retentive his memory, can keep in mind more than a small fraction of the things desirable to know. Facts are accumulating too fast for that.

Facts, we are often told, are stubborn things. They truly are when we call them and they will not come; when we seek them, and they are not to be found; when such as we have once met hide themselves away in some obscure recess of our brains and refuse to come forth in response to our most earnest demand. Facts are elusive and baffling things, escaping us when we most want them, playing about us just out of reach, failing to respond to whistle or call. Yet they are things we need daily; hardly an hour passes in which there is not something that we wish to know, and we seek in the cells of memory in vain. Facts are our tools in trade, the most useful and necessary

implements of the man of affairs, the steady demand of the growing boy and girl; and nothing is more useful in home and office, in school and library, than an ample library of reference of the things the world wants to know, a cabinet whose door may be opened at a moment's notice and the stubbornest fact drawn triumphantly forth. All must acknowledge that such a library of reference is a very convenient thing to have at one's elbow—indispensable would be a better word. Such a library we have here, a work replete with facts in the most satisfying fulness and variety, brimful of useful information, containing just what everyone most wants to know.

The editors have sought the assistance, in its preparation, of scholars and practical writers, thoroughly conversant with the topics placed in their hands, with every confidence in the trustworthy results of their labors. Throughout it has been our endeavor to make a *practical aid* to those who may have occasion to use it. Each subject has been treated with the fulness suited to its degree of importance, and special merits claimed for this work are its newness and freshness of material, its width of scope and its logical arrangement.

In conclusion, we may refer to the wealth of well-chosen illustrations, which have been prepared without regard to effort or expense, the purpose being to present the best that artistic skill could suggest and execute to supplement the printed page. Science, business, mechanics, history, biography, etc., all furnish subjects for illustration, our constant effort having been to present a useful work. In this we think all must acknowledge that we have abundantly succeeded.

THE PUBLISHERS.

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KEY TO PRONUNCIATION

Three methods are used to indicate the pronunciation of the words forming the headings of the separate articles:

(1) By dividing the word into syllables, and indicating the syllable or syllables to be accented. This method is followed where the pronunciation is entirely obvious. Where accent marks are omitted, the omission indicates that all syllables are given substantially the same value.

(2) Where the pronunciation differs from the spelling, the word is re-spelled phonetically, in addition to the accentuation.

(3) Where the sound values of the vowels are not sufficiently indicated merely by an attempt at phonetic spelling, the following system of diacritical marks is additionally employed to approximate the proper sounds as closely as may be done:

ā, as in *fate*, or in *bare*.
 ä, as in *alms*, Fr. *âme*, Ger. *Bahn*=ā of Indian names.
 ʌ, the same sound short or medium, as in Fr. *bal*, Ger. *Mann*.
 a, as in *fat*.
 ʌ, as in *fall*.
 ʊ, obscure, as in *rural*, similar to *u* in *but*, é in *her*: common in Indian names.
 ē, as in *me*=i in *machine*.
 e, as in *met*.
 é, as in *her*.
 i, as in *pine*, or as *ei* in Ger. *Mein*.
 i, as in *pin*, als used for the short sound corresponding to ē, as in French and Italian words.

eu, a long sound as in Fr. *jeune*, = Ger. long *ö*, as in *Söhne*, *Goethe* (Goethe).
 eu, corresponding sound short or medium, as in Fr. *peu*=Ger. *ö* short.
 ô, as in *note*, *moan*.
 (as in *not*, *frog*—that is, short or medium.
 ō, as in *move*, *two*.
 ū, as in *tube*.
 u, as in *tub*: similar to é and also to a.
 u, as in *bull*.
 ũ, as in *Se abune*=Fr. *û* as in *dû*, Ger. *ü* long as in *grün*, *Bühne*.
 û, the corresponding short or medium sound, as in Fr. *but*, Ger. *Müller*.
 oi, as in *oil*.
 ou, as in *pound*; or as *au* in Ger. *Haus*.

The consonants, b, d, f, h, j, k, l, m, n, ng, p, sh, t, v, and z, when printed in Roman type, are always given their common English values in the transliteration of foreign words. The letter c is indicated by s or k, as the case may be. For the remaining consonant sounds the following symbols are employed:

ch is always as in *rich*.
 d, nearly as *th* in *this* = Sp. *d* in *Madrid*, etc.
 g is always hard, as in *go*.
 h represents the guttural in Scotch *loch*, Ger. *nach*, also other similar gutturals.
 ʒ, Fr. nasal *n* as in *bon*.
 r represents both English *r*, and *r* in foreign words, in which it is gen-

erally much more strongly trilled.
 s, always as in *so*.
 th, as *th* in *thin*.
 th, as *th* in *this*.
 w always consonantal, as in *we*.
 x = ks, which are used instead.
 y always consonantal, as in *yea* (Fr. *ligne* would be re-written *ligny*).
 zh, as *s* in *pleasure* = Fr. *j*.

VOLUME I

A

A, the first letter in the English alphabet, and in most alphabets derived from the Phœnician. Most modern languages, as French, Italian, German, have only one sound for *a*, namely, the sound which is heard in *father* pronounced short or long; in English this letter is made to represent seven sounds, as in the words *father, mat, mate, mare, many, ball, what*, besides being used in such digraphs as *ea* in *heat, oa*, in *boat*. (See *Music*).

A1, a symbol attached to vessels of the highest class in Lloyd's register of shipping, *A* referring to the hull of the vessel, while *1* intimates the sufficiency of the rigging and whole equipment. Iron vessels are classed *A1* with a numeral prefixed denoting that they are built according to certain specifications.

Aa (ä; from old German *aha*; allied to Latin *aqua*, water), the name of a great many streams of central and northern Europe.

Aachen (ä'hên). See *Aix-la-Chapelle*.

Aal (äl), red dye obtained from the root of *Morinda citrifolia* (allied to *Madder*), used largely for dyeing cotton cloth in India. The center of the industry is at Gujarat.

Aalborg (ä'l'borh; 'eel-town') a seaport of Denmark. Pop. 35,000.

Aalen (ä'l'en), town in E. Würtemberg, Germany, on the Kocher, with iron works, woolen mills and metalware manufactures. Pop. 12,000.

Aalesund (ä'l'sound; 'eel sound'), a fishing port of Norway, with an extensive trade. Pop. 13,836.

Aali Pasha (ä'lë pa-shä'), Turkish diplomatist, was born in 1815; died in 1871. He served five terms as grand vizier, or prime minister, and was prominent as minister of foreign affairs and as an advocate of reform.

Aar (är), the name of several European rivers, of which the chief

(160 miles long) is a tributary of the Rhine, next to it and the Rhone the longest river in Switzerland. It has its origin from the upper and lower glaciers of the Aar in the Bernese Alps. On it are Interlaken, Thun, Bern, Solothurn and Aarau, to which, as to the canton of Aargau, it gives its name.

Aarau (ä'rou), a well-built and finely situated town in Switzerland, capital of Canton Aargau, on the river Aar. Pop. 9,336.

Aardvark (ärd'värk; earth-pig), a burrowing insectivorous animal of South Africa, *Orycteropus capensis*, order Edentata, having affinities with the ant-eaters and armadillos. Called also *ground-hog* and *Cape pig*.

Aardwolf (ärd'wulf; earth-wolf; *Proteles cristatus*), a carnivorous burrowing animal of South Africa, allied to the hyenas and civets. Feeds on carrion, small mammals, insects, etc.

Aarestrup (ä'r'es-trup), CARL LUDWIG EMIL, (1800-56), Danish poet, born in Copenhagen, one of the greatest lyrists of Denmark. His *Efterladte Digte* (1863) created a sensation by their erotic tone. His *Samlede Digte* were edited by Georg Brandes.

Aargau (ä'r'gou), or ARGOVIE (ä'r'go-vë), a northern canton of Switzerland; area, 543 square miles; hilly, well wooded, abundantly watered by the Aar and its tributaries, and well cultivated. It formed part of the canton Bern till 1798. Pop. 229,571, of whom more than half are Protestants. German is commonly spoken. Capital, Aarau.

Aarhus (ör'hös), a seaport and ancient town of Denmark, on the east coast of Jutland; has a fine Gothic cathedral, a good harbor, considerable trade and manufactures of woolens, gloves, hats, tobacco, etc. Pop. 58,000.

Aaron (ä'ron), of the tribe of Levi, eldest son of Amram and Jochbed, and brother and assistant of

Aaron's Beard

Moses. At Sinai, when the people became impatient at the long-continued absence of Moses, he complied with their request in making a golden calf, and thus became involved with them in the guilt of gross idolatry. The office of high-priest, which he first filled, was made hereditary in his family. He died at Mount Hor at the age of 123, and was succeeded by his son Eleazar.

Aaron's Beard. See *Saint John's wort* and *Toad-flax*.

Aaron's Rod. See *Golden-rod* and *Mullein*.

Aasen (ä'sen), IVAR ANDREAS, Norwegian author and philologist, born in 1813; died in 1896; was of peasant origin and self-educated. His chief work was that of reconstructing an eclectic national language out of existing Norwegian dialects. In 1848 his *Norske Folkesprogs Grammatik* appeared, followed in 1850 by his *Ordbog over det Norske Folkesprog*. Later publications, dealing particularly with his labors in reforming the language, were a grammar, *Norsk Grammatik*, 1864, and a dictionary, *Norsk Ordbog*, 1873, supplemented by the *Norsk Ordbog*, 1890-92, of Hans Ross.

Aasvar (ös'vär), a group of small islands off the Norwegian coast, under the Arctic Circle, where there is an important December herring-fishery.

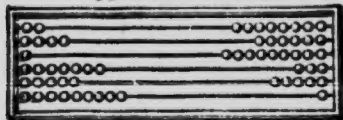
Ab, the eleventh month of the Jewish civil, the fifth of the ecclesiastical, year—part of July and part of August.

Ababdeh (ab-ab'de), a nomadic African race inhabiting Upper Egypt and part of Nubia, between the Nile and the Red Sea, of Hamitic stock, and thus akin in race to the ancient Egyptians; dark brown in color; Mohammedans in religion.

Abaca (ab'a-ka), or MANILA HEMP, a strong fibre yielded by the leaf-stalks of a kind of plantain (*Musa textilis*), which grows in the Indian Archipelago, and is cultivated in the Philippines. The outer fibres of the leaf-stalks are made into strong and durable ropes, the inner into various fine fabrics.

Abac, GREAT and LITTLE, two islands of the Bahamas group.

Abacus, a Latin term applied to an apparatus used in elementary



Abacus for Calculations,

schools for facilitating arithmetical

Abatement

operations, consisting of a number of parallel cords or wires, upon which balls or beads are strung, the uppermost wire being appropriated to units, the next to tens, etc. In classic architecture it denotes the tablet forming the upper member of a column, and supporting the entablature. In Gothic architecture the upper member of a column from which the arch springs.



Doric Capital—a, the Abacus.

Abaddon (a-bad'un; Heb. destruction), the name given in Rev., ix. 11, as that of the angel of the bottomless pit, otherwise called *Apollyon*.

Abancay (ä-ban-ki'), the chief city in Apurimac department, a silver mining district of Peru, about 40 miles southwest of Cuzco. Sugar refining is the principal industry. Pop. 5000.

Abalone (ab-a-lö'ne), a name in California for a species of ear-shell (*Haliotis*) that furnishes mother-of-pearl.

Ab'ana, a river near Damascus.

Abandonment (a-ban'don-ment), a term of marine insurance, employed to designate the case where the party insured gives up his whole interest in the property to the insurer, and claims as for a total loss.

Abano (ä'bä-nö), a village of North Italy, 5 miles from Padua, famous for its mud-baths and warm springs. It claims to be the birthplace of Livy. Pop. (commune) about 4,000.

Ab'ano, d' PIETRO, a celebrated Italian physician, philosopher, and astrologer, born at Abano in 1250, died at Padua in 1316. He studied at Padua, went to Constantinople to learn Greek, visited Paris and studied mathematics and medicine, and traveled in England and Scotland. He became professor of medicine at Padua, and wrote on this subject and on philosophy.

Abarim (ä-bä'rim), mountain range of Eastern Palestine, including Nebo, whence Moses is said to have viewed the Promised Land.

Abatement (a-bät'ment), in law, has various uses. *Abatement of nuisances* is the remedy allowed to a person injured by a public or private nuisance, of destroying or removing it himself. A *plea in abatement* is brought forward by a defendant when he wishes to defeat or quash a particular action on some formal or technical ground. *Abate-*

Abattis

ment, in mercantile law, is an allowance, deduction, or discount made for prompt payment or other reason.

Abattis (ab'a-tis), **ABATIS**, in military affairs, a mass of trees cut down and laid with their branches turned towards the enemy in such a way as to form a defence for troops stationed behind them.

Abattoir (ab-at-wär'), a French term for a slaughter-house, now anglicized. The abattoirs of Paris were instituted by Napoleon in 1807, and brought to completion in 1818. Such public slaughter-houses, provided with every sort of convenience, kept admirably clean, and with a plentiful supply of water, are now to be found in many large towns. They exist in all the large cities of the United States, and on a very large scale in the great meat-packing cities of the West, notably in Chicago.

Abauzit, **FIRMIN** (á-bö-zè), a French Protestant scholar, born in 1679, died 1767. He lived chiefly at Geneva, but visited England and was highly esteemed by Newton, who considered him not unfit to be judge between himself and Leibnitz in the quarrel as to the invention of the integral and differential calculus. He left few writings.

Abbadie, **D'** (áb-á-dè), **ANTOINE THOMSON** and **ARNAUD MICHEL**, French travelers, born in Dublin in 1810 and 1815, respectively. They spent a number of years in Abyssinia, and published works throwing much light on that country; by Arnaud, *Douze ans dans la Haute-Ethiopie*; by Antoine, *Géodésie d'Ethiopie*, etc. The elder died in 1897, the younger in 1893.

Abbas I (áb-bäs), the *Great*, Shah or King of Persia, born in 1557, obtained the throne in 1586, and died in 1628. He obtained several victories over the Turks and Usbek Tartars, and extended his rule until his dominions stretched from the Tigris to the Indus. He is looked upon by the Persians as their greatest sovereign.

Abbas Mirza, a Persian prince and shah Feth Ali, born 1783, died 1833. He reorganized his army on the European system and distinguished himself in the wars against Russia.

Abbassides (ab'as-síd-z), the name of an Arabian dynasty which supplanted the Omniades. It traced its descent from Abbas (born 586, died 652), uncle of Mohammed, and furnished thirty-seven caliphs to Bagdad between 749 and 1258. Harun al Rashid was a member of this dynasty. See *Caliphs*.

Abbey

Abbate (áb-bä'ta), the Italian term corresponding to *Abbé*.

Abbe, **CLEVELAND**, meteorologist, born in New York 1838; graduated at College of City of New York in 1857; studied astronomy and meteorology, and as director of Cincinnati Observatory (1868-73) inaugurated the system of daily weather reports. This led the United States to take up similar work, under his supervision. He was meteorologist of the U. S. Signal Service 1871-91; after 1891 meteorologist of the Weather Bureau; also professor of meteorology of Columbian University. Published various meteorological treatises.

Abbé (áb-á), the French word for abbot, was, before the French revolution, the common title of all who had studied theology either with a view to become ordained clergymen or merely in the hope of obtaining some appointment or benefice, to which such study was considered a preliminary requisite. They were marked out by their short, violet-colored robe, and formed an influential class in society, though often with little of the clerical in manners or character. They acted at times as chaplains or tutors in noble families or engaged in literary work or as college professors.

Abbeokuta (á-be-o-koo'tá), capital of the province of Egba, in Yoruba, 80 miles N. of Lagos. It is a town of West Africa composed of scattered and filthy lines of houses built of mud, and surrounded by a mud wall 17 or 18 miles in circuit. Pop. 150,000.

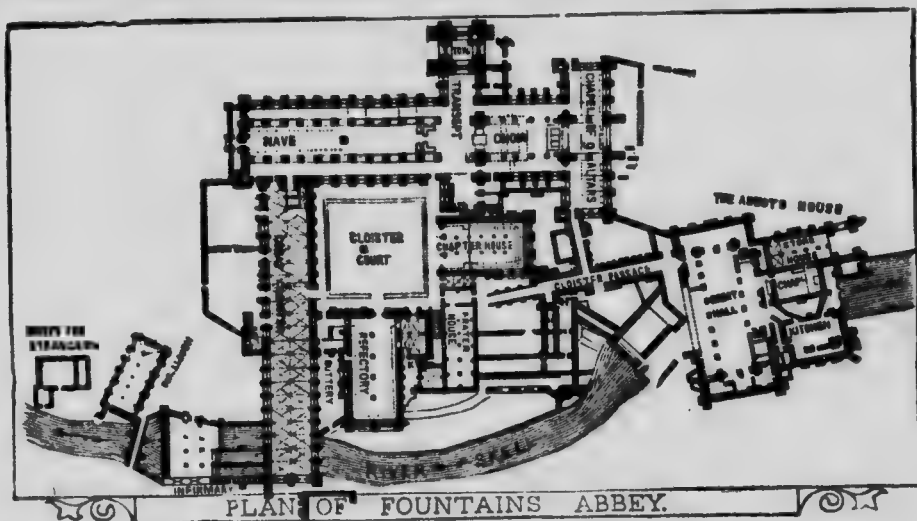
Ab'bess. See *Abbey* and *Abbot*.

Abbeville (áb-vél'), a town of France, dep. Somme, on the river Somme (which is here tidal), 25 miles N. W. of Amiens. It has a Gothic church (St. Wolfram) with magnificent west front in the Flamboyant style; manufactures of woollens, carpets, sugar, etc., and considerable trade. Pop. 22,000.

Abbey (ab'è), a monastery or religious community of the highest class, governed by an *abbot*, assisted generally by a prior, a subprior, and other subordinate functionaries; or, in the case of a female community, superintended by an *abbess*. An abbey invariably included a church. A priory differed from an abbey only in being scarcely so extensive an establishment, and was governed by a prior. In the English conventual cathedral establishments, as Canterbury, Norwich, Ely, etc., the archbishops or bishops held the abbot's place, the immediate governor of the monastery being called a prior. Some priories sprang originally from the more important abbeys, and re-

maintained under the jurisdiction of the abbots; but subsequently any real distinction between abbeys and priories was lost. The greater abbeys formed most complete and extensive establishments, including not only the church and other buildings devoted to the monastic life and its daily requirements, such as the refectory or eating-room, the dormitories or sleeping-rooms, the room for social intercourse, the school for novices, the scribes' cells, library, and so on; but also workshops, storehouses, mills, cattle and poultry sheds, dwellings for artisans, laborers, and other servants, infirmary, guest-house, etc. Among the most famous abbeys on the continent of Europe were those of Cluny, Clairvaux, and Cîteaux in France, St. Gall in Switzerland, and

Abbot (ab'ut), (ultimately from Syriac *abba*, father), the head of an abbey (see *Abbey*), the lady of similar rank being called *abbess*. An abbess, however, was not, like the abbot, allowed to exercise the spiritual functions of the priesthood, such as preaching, confessing, etc.; nor did abbesses ever succeed in freeing themselves from the control of their diocesan bishop. In the early age of monastic institutions (say 300-600 A. D.) the monks were not priests, but simply laymen who retired from the world to live in common, and the abbot was also a layman. In the course of time the abbots were usually ordained, and when an abbey was directly attached to a cathedral the bishop was also abbot. At first the abbeys were



Fulda in Germany; the most noteworthy English abbeys were those of Westminster, St. Mary's of York, Fountains, Kirkstall, Tintern, Rievaulx, Netley; and of Scotland, Melrose, Paisley, and Arbroath. See *Abbot, Monastery*.

Ab'bey, EDWIN AUSTIN, artist; born at Phila. Academy of the Fine Arts. Exhibited his first picture, *A May Day Morning*, at the Royal Academy in 1890; was commissioned by King Edward VII to paint the scene of his coronation in 1901. Has painted many notable pictures, including *Crusaders Sighting Jerusalem*, *The Quest of the Holy Grail*, etc., also two published illustrated editions of *Herrick's Poems*, *She Stoops to Conquer*, *Comedies of Shakespere*, etc. Died 1911.

Abbiategrasso (áb-bē-ll' tã-grás-só),
a town in the
north of Italy, 14 miles W. S. W. of Milan.
Pop. about 14,000.

more remarkable for their numbers than for their magnitude, but latterly many of them were large and richly endowed, and the heads of such establishments became personages of no small influence and power, more especially after the abbots succeeded (by the eleventh century) in freeing themselves from the jurisdiction of the bishop of their diocese. Hence families of the highest rank might be seen eagerly striving to obtain the titles of abbot and abbess for their members. The great object was to obtain control over the revenues of the abbeys, and for this purpose recourse was had to the device of holding them under a kind of trust, or, as it was called, *in commendam*. According to the original idea the abbot *in commendam*, or 'commendator,' was merely a temporary trustee, who drew the whole or part of the revenues during a vacancy, and was bound to apply them to specific purposes; but ultimately the

commendator or lay abbot in many instances held the appointment for life, and was allowed to apply the whole or a large portion of the revenues to his own private use. Many of the abbots latterly vied with the bishops and nobility in rank and dignity, wearing a miter and keeping up a great style. In England twenty-eight abbots long sat in the House of Lords. The Reformation introduced vast changes, not only in Protestant countries, where abbeys and all other monastic establishments were generally suppressed, but even in countries which still continued Roman Catholic; many sovereigns, while displaying their zeal for the R. Catholic Church by persecuting its opponents, not scrupling to imitate them in the confiscation of church property. The title *abba* is given to the bishops of the Copts and Syrians, and *abuna* ('our father') to the head of the Abyssinian Church.

Abbot of Misrule, the personage who took the chief part in the Christmas revelries of the English populace before the Reformation.

Abbot, GEORGE, Archbishop of Canterbury, born 1562; died 1633; studied at Oxford, assisted in the translation of the Bible, was made Bishop of Lichfield in 1609, next year Bishop of London, and in 1611 Archbishop of Canterbury. He retained the favor of James I to the last, but after the accession of Charles I his influence at court was superseded by that of Laud. He published several works, chiefly theological.

Abbotsford (ab'bots-ford), the country seat of Sir Walter Scott, on the south bank of the Tweed, in Roxburghshire, 3 miles from Melrose, in the midst of picturesque scenery, forming an extensive and irregular pile in the Scottish baronial style of architecture.

Abbott, CHARLES CONRAD, an American naturalist, born in 1843. His chief work has consisted in collecting prehistoric human relics. He published various writings, including *Primitive Industry, In Nature's Realm*, etc.

Abbott, EMMA, American opera singer, born at Chicago, Ill., 1849; died at Salt Lake City, Utah, in 1891. She organized the Emma Abbott Opera Company.

Abbott, LYMAN, son of Jacob Abbott, born 1835, Congregational clergyman. He succeeded Beecher in Plymouth Church, Brooklyn, in 1888, retiring in 1898. Since Beecher's death he has been editor of the *Outlook*.

Abbreviations (a-bré-vi-a'shuns), devices used in writing

and printing to save time and space, consist usually of curtailments effected in words and syllables by the removal of some letters, often of the whole of the letters except the first. The following is a list of the more important:—

- @, ad, at.
- A. B., *artium baccalaureus*, bachelor of arts.
- A. C., *ante Christum*, before Christ.
- Acc., A/c. or Acct., account.
- A. D., *anno Domini*, in the year of our Lord; used also as if equivalent to, 'after Christ,' or 'of the Christian era.'
- A. D. C., *aide-de-camp*.
- Ad inf., *ad infinitum*, to infinity.
- Ad lib., *ad libitum*, at pleasure.
- Æt. or Ætat., *ætatis* (anno), in the year of his age.
- A. H., *anno Hegiræ*, in the year of the Hegira.
- Ala., Alabama.
- A. M., *anno mundi*, in the year of the world; *ante meridiem*, forenoon; *artium magister*, master of arts.
- Anon., anonymous.
- A. R. A., associate of Royal Academy.
- Ariz., Arizona.
- Ark., Arkansas.
- Atty.-Gen., attorney-general.
- A. U. C., *ab urbe condita*, from the building of Rome (753 B. C.)
- A. V., authorized version.
- B. A., bachelor of arts.
- Bart. or Bt., baronet.
- bbl., barrel.
- B. C., before Christ.
- B. C. L., bachelor of civil law.
- B. D., bachelor of divinity.
- B/L, bill of lading.
- B. L., bachelor of laws.
- B. M., bachelor of medicine.
- B. Mus., bachelor of music.
- B. S., bachelor of surgery.
- B. Sc., or B. S., bachelor of science.
- B. V. M., Blessed Virgin Mary.
- C., cap., or chap., chapter.
- C., *centum*, hundred, also centigrade.
- Cal., California.
- Can., Canada.
- Cantab., of Cambridge.
- Capt., captain.
- c. c., Cc., cubic centimetre.
- C. E., civil engineer.
- Cf., *confer*, compare.
- C. J., chief justice.
- C. M., *chirurgia magister*, master in surgery; common metre.
- c. m., centimetre.
- Co., company or county.
- C. O. D., cash on delivery.
- Col., colonel.
- Colo., Colorado.
- Com., commander, committee.
- O. S., Christian Science.

Abbreviations

Abbreviations

- Conn., Connecticut.
 Cr., credit, creditor.
 Crim. con., criminal conversation.
 C. S., civil service.
 Curt., current, the present month.
 Cwt., hundredweight.
 d., *denarius*, penny or pence.
 D. C., District of Columbia; *da capo*, from the beginning.
 D. C. L., doctor of civil law.
 D. D., doctor of divinity.
 D. D. S., doctor of dental surgery.
 Del., Delaware.
 Dep., deputy.
 Dept., Department.
 D. F., defender of the faith.
 D. G., *Dei gratia*, by the grace of God.
 Dict., dictionary.
 D. Lit., doctor of literature.
 do., *ditto*, the same.
 D. O., doctor of osteopathy.
 D. O. M., *Deo Optimo Maximo*, to God, the Best and the Greatest.
 Dr., doctor, also debtor.
 D. Sc., doctor of science.
 D. V., *Deo volente*, God willing.
 E., east.
 Ed., edition; editor.
 E. E., errors excepted, electrical engineer.
 e. g., *exempli gratia*, for example.
 E. I., East Indies.
 Eng., England.
 Esq., esquire.
 et al., et alii, and others.
 et seq., and the following.
 etc. or &c., *et cætera*, and the rest, and so on.
 Exr., executor.
 F., franc, florin, farthing, foot.
 F. or Fahr., Fahrenheit's thermometer.
 F. A. S., fellow of the Antiquarian Society.
 F. D., *fidei defensor*, defender of the faith.
 Fec., *fecit*, he made or did it.
 F. F. V., first families of Virginia.
 F. G. S., fellow of the Geological Society.
 Fla., Florida.
 F. M., field-marshal.
 F. O. B., free on board (to delivered).
 F. R. A. S., fellow of the Royal Astronomical (or Asiatic) Society.
 F. R. G. S., fellow of the Royal Geographical Society.
 F. R. S., fellow of the Royal Society.
 F. R. S. E., fellow of the Royal Society of Edinburgh.
 Fr., France.
 ft., foot or feet.
 g., gr., gramme.
 G. B., Great Britain.
 Gen., General, Genesis.
 Ga., Georgia.
 Ger., Germany.
 G. O. P., Grand Old Party (the U. S. Republican party).
 Gov., governor.
 Hhd., hoghead.
 H. M. S., his or her majesty's ship or service.
Hoc est, this is.
 Hon., honorable.
 Ia., Iowa.
 Ib. or Ibid., *Ibidem*, in the same place.
 Id., *idem*, the same.
 Ida., Idaho.
 i. e., *id est*, that is.
 + I. H. S., *Jesus hominum salvator*, Jesus, Saviour of men. The letters, at first an abbreviation of the Greek for Jesus, came to stand for three words.
 Ill., Illinois.
 incog., *incognito*, unknown.
 Ind., Indiana.
 inf., *infra*, below.
 inst., instant, or of this month; institute.
 I. O. O. F., Independent Order of Odd Fellows.
 I. O. U., I owe you.
 i. q., *idem quod*, the same as.
 J. D., *juris doctor*, doctor of law.
 J. P., justice of the peace.
 Jr., junior.
 J. U. D., *juris utriusque doctor*, doctor both of the civil and the canon law.
 Kans., Kansas.
 K. C., king's counsel.
 K. C. B., Knight Commander of the Bath.
 kg. or kilog., kilogramme.
 K. G. F., knight of the Golden Fleece.
 kilo., kil., kilometre.
 Kt., or Knt., knight.
 Ky., Kentucky.
 L., l., or £, pounds sterling.
 La., Louisiana.
 Lat., Latin, latitude.
 lb. or lb. *libra*, a pound (weight).
 l. c., *loco citato*, in the place cited.
 Lib. (*liber*), a book.
 Lieut., lieutenant.
 Litt. D., doctor of literature.
 LL. B., *legum baccalaureus*, bachelor of laws.
 LL. D., *legum doctor*, doctor of laws (that is the civil and the canon law).
 LL. M., master of laws.
 Lon. or Long., longitude.
 L. S., *locus sigilli*, the place of the seal.
 L. S. D., *libra, solidi, denarii*, pounds shillings, pence.
 M., monsieur.
 M. A., master of arts.
 Maj., major.
 Maj.-gen., major-general.
 Mass., Massachusetts.
 Math., mathematics.
 M. B., bachelor of medicine.
 M. C., member of Congress.

Abbreviations

Abbreviations

- M. D., *medicinæ doctor*, doctor of medicine.
 Md., Maryland.
 Me., Maine.
 M. E., mining engineer; Methodist Episcopal.
 M. F. H., master of fox hounds.
 Mem., memorandum.
 Messrs., *messieurs*, gentlemen.
 Mich., Michigan.
 Minn., Minnesota.
 Miss., Mississippi.
 Mlle., *mademoiselle*.
 mm., millimetre.
 Mme., madame.
 Mo., Missouri.
 Mont., Montana.
 M. P., member of Parliament.
 MS., manuscript; MSS., manuscripts.
 M. S., master of science.
 Mus. D., *musicæ doctor*, doctor of music.
 N., north; name.
 N. A., North America.
 N. B., *nota bene*, take notice; also New Brunswick.
 N. C., North Carolina.
 N. Dak., North Dakota.
 N. E., northeast.
 Nebr., Nebraska.
 Nem. con., *nemine contradicente*, no one contradicting, unanimously.
 Nev., Nevada.
 N. H., New Hampshire.
 N. J., New Jersey.
 N. Mex., New Mexico.
 No., *numero*, number.
 N. P., notary public.
 N. S., new style, Nova Scotia.
 N. S. W., New South Wales.
 N. T., New Testament.
 N. W., northwest.
 N. Y., New York.
 N. Z., New Zealand.
 O., Ohio.
 Ob., *obiit*, died.
 O. K., all correct.
 Okla., Oklahoma.
 Ore., Oregon.
 O. S., old style.
 O. T., Old Testament.
 Oxon., *Oxoniensis*, of Oxford.
 oz., ounce or ounces.
 Pa., Penn., Penna., Pennsylvania.
 P. C., privy-councilor.
 P. E., Protestant Episcopal.
 Ped. D., doctor of pedagogy.
 per cent., *per centum*, by the hundred.
 Ph. B., bachelor of philosophy.
 Ph. D., *philosophiæ doctor*, doctor of philosophy.
 P. M., *post meridiem*, afternoon.
 P. O., postoffice.
 P. P., parish priest; past participle.
 P. pr., present participle.
 P. P. C., *pour prendre congé*, to take leave.
 Prep., preposition.
 Pres., president.
 Prof., professor.
 Pron., pronoun.
 Pro tem., *pro tempore*, for the time being.
 prox., *proximo* (*mense*), next month.
 P. S., postscript.
 P. T. O., please turn over.
 Q., question; queen.
 q. e., *quod est*, which is.
 Q. E. D., *quod erat demonstrandum*, which was to be demonstrated.
 Q. M. G., quartermaster-general.
 Quant. suff., *q. s.*, *quantum sufficit*, as much as is needful.
 q. v., *quod vide*, which see.
 R., *rex*, *regina*, king, queen.
 R. A., royal academician.
 R. C., Roman Catholic.
 R. E., royal engineers, right excellent.
 Rev., reverend.
 R. I., Rhode Island.
 R. I. P., *requiescat in pace*, may he rest in peace.
 R. R., railroad.
 R. S. V. P., *répondez, s'il vous plait*, reply, if you please.
 Rt. Hon., right honorable.
 Rt. Rev., right reverend.
 R. V., revised version.
 S., south.
 S. or St., saint.
 S. C., South Carolina; Supreme Court.
 Sc. or Scil., *scilicet*, namely, viz.
 S. Dak., South Dakota.
 S. E., southeast.
 Sec., secretary; section; second.
 Seq., *sequens*, the following.
 S. J., Society of Jesus (Jesuits).
 S. P. Q. R., *senatus populusque Romanus*, the senate and people of Rome.
 sq. ft., square feet.
 sq. in., square inches.
 sq. m., square miles.
 Sr., senior.
 St., saint, street.
 Ste., sainte.
 S. v., *sub voce*, under the word or heading.
 S. W., southwest.
 Tenn., Tennessee.
 Tex., Texas.
 T. N. T., trinitrotoluene.
 U., Utah.
 ult., *ultimo*, last (month).
 U. of S. A., Union of South Africa.
 U. S., United States.
 U. S. A., United States of America.
 United States army.
 U. S. N., United States navy.
 V., *vide*, see; also *versus*, against.
 v., volt or volts.

Va., Virginia.
 V. C., Victoria Cross.
 V. D. M., *verbi dei minister*, minister of the word of God.
 Vice-Pres., vice-president.
 Vis., *videlicet*, to wit, or namely.
 V. S., veterinary surgeon.
 vs., *versus*, against.
 Vt., Vermont.
 W., west.
 Wash., Washington.
 W. I., West Indies.
 Xmas, Christmas.
 Wis., Wisconsin.
 W. Va., West Virginia.
 Wyo., Wyoming.
 &, and.
 &c., and so forth.

In LL. D., LL. B., etc., the letter is doubled, according to the Roman system, to show that the abbreviation represents a plural noun.

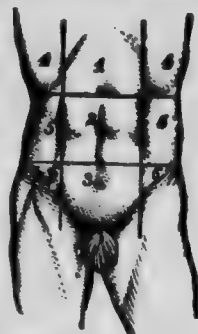
Abd-el-Kader (äbd-el-kä'der), an Arab chief born in Algeria, 1807; died at Damascus, 1883. He was the chief opponent of the French in their conquest of Algeria, but at last surrendered to them in 1847, and was imprisoned till set at liberty by Napoleon III, in 1852. Afterwards he resided chiefly at Damascus, but made various journeys, and visited the Paris exhibition of 1867. He wrote a religious work in Arabic.

Abdera (ab-dë'ra), an ancient Greek city on the Thracian coast, the birthplace of Democritus (the laughing philosopher), Anaxarchus, and Protagoras. Its inhabitants were proverbial for stupidity.

Abdication (ab-di-ka'shun), properly the voluntary, but sometimes also the involuntary, resignation of an office or dignity, and more especially that of sovereign power. Abdication does not necessarily require the execution of a formal deed, but may be presumed from facts and circumstances, as in the case of the English Revolution in 1688, when, after long debate, it was resolved by both houses of parliament that King James II, having endeavored to subvert the constitution of the kingdom, had 'abdicated the government, and that the throne is thereby vacant.' Yet the sovereign of Great Britain cannot constitutionally abdicate without the consent of both houses of parliament.

Abdomen (ab-do'men), in man, the belly, or lower cavity of the trunk, separated from the upper cavity or thorax by the diaphragm or midriff, and bounded below by the bones of the pelvis. It contains the viscera belonging to the digestive and urinary systems.

What are called the *abdominal regions* will be understood from the accompanying cut, in which 1 is the *epigastric* region, 2 the *umbilical*, 3 the *pubic*, 44 the right and left *hypochondriac*, 55 the right and left *lumbar*, 66 right and left *iliac*. The name is given to the corresponding portion of the body in other animals. In insects it comprises the whole body behind the thorax, usually consisting of a series of rings.



Abdominal Regions.

Abdominal Fishes (Abdominales), a group of the soft-finned (or malacopterous) fishes having fins upon the abdomen, and comprising the herring, pike, salmon, carp, etc.

Abduction (ab-duk'shun), a legal term, generally applied to denote the offense of carrying off a female, either forcibly or by fraudulent representations. Such a delinquency in regard to a man is styled *kidnapping*.

Abdul-Aziz (ab'döl-az'ez), Sultan of Turkey, brother to Abdul-Mejid, whom he succeeded in June, 1861. He concluded treaties of commerce with France and England, both of which countries he visited in 1867. Deposed in May, 1876, he committed suicide, or more probably was assassinated, in June, the same year. He was succeeded by his nephew, Murad V.

Abdul Baha (äbd'ool bä-hä'), a religious leader, head of the Bahaist movement, born in Persia. For forty years Abdul Baha was imprisoned, and it was not until after the Young Turks came into possession of the government, that he was free to travel. He visited the United States in 1912, talking to Bahaists in many cities.

Abdul-Hamid II (ab'döl-ha'mid), Sultan of Turkey, younger son of Abdul-Mejid, born in 1842, succeeded his brother Murad V. At that time Turkey, which was at war with Russia, was forced to an armistice by Russia. The persecution of the Christian population of Bulgaria led, in April, 1877, to a declaration of war by Russia. During the struggle which ensued the Turks fought with great bravery, but they had ultimately to sue for peace. A treaty was signed at San Stefano, in February, 1878, but its provisions were modified by a congress of the great powers. (See *Berlin, Treaty of*.) In 1908 Abdul

Abdul-Latif

was obliged by the demands of reformers to restore the constitution which he had abrogated in 1876. An effort on his part to regain his autocratic power led to a military outbreak in 1900, ending in his deposition in favor of his brother Mohammed. Died Feb. 10, 1918.

Abdul-Latif (ab'dül-la-ter') an Arab writer and physician, born at Bagdad in 1161, died there in 1231. He was patronized by the celebrated Saladin, and published an excellent description of Egypt, which is still extant.

Abdul-Mejid (ab'dül-me-jed'), Sultan of Turkey, born in 1822 or 1823, succeeded his father, Mahmud II, July 1, 1839. At the time of his accession Mehemet, Pasha of Egypt, had a second time risen against the Turkish yoke; his son Ibrahim had inflicted a severe defeat on the Turks at Nizib (24th June, 1839), and was advancing on Constantinople. But the intervention of the leading European powers checked the designs of Mehemet Ali, and saved the Turkish empire. Abdul-Mejid was desirous of carrying out reforms, but most of them remained inoperative, or caused bloody insurrections where attempts were made to carry them out. Owing to disputes between the Latin and Greek Churches regarding the rights of precedence and possession at the 'holy places' in Palestine, and to demands made by the czar virtually implying the right of protectorate over the Christian subjects of the sultan, war broke out between Turkey and Russia in 1853. In the following year the Porte effected an alliance with France and England (hence the Crimean War), and later on with Sardinia. (See *Crimean War*.) Abdul-Mejid died in 1861, and was succeeded by his brother, Abdul-Aziz.

Abdur-Rahman III (äbd-er-räh'-man), surnamed An Nasir, eighth Sultan and first Caliph of Cordova, began to reign in 912. Brought the Mohammedan empire in Spain to its highest pinnacle of glory. Built a palace near Cordova of unequalled magnificence. Died in 961.

Abdur-Rahman, Ameer of Afghanistan, born about 1830, was chosen ameer in 1880 and proved an able ruler, friendly to the British, who paid him an annual subsidy. Died, 1901.

Abecedarian (ä-bä-sä-da'-ri-an), a term formed from the first four letters of the alphabet, and applied to the followers of Storch, a German Anabaptist, in the sixteenth

century, because they rejected all worldly knowledge, even the learning of the alphabet.

A Becket THOMAS. See *Becket*.

A Beckett, GILBERT ABBOTT, English writer, born near London in 1811. He studied for the bar, and became one of the original staff of *Punch*, was long a leader-writer of the *Times* and *Morning Herald*. He wrote *Comic History of England*, *Comic History of Rome*, and *Comic Blackstone*, and between fifty and sixty plays, some of which still keep the stage. In 1849 he was appointed a metropolitan police magistrate, an office he retained till his death in 1856. His son, ARTHUR WILLIAM, born in 1844, became a journalist and wrote a number of plays and novels. He was on the staff of *Punch* from 1874 to 1902.

Abel (ä'bel), properly *Hebel* (Heb. breath, vapor, transitoriness), the second son of Adam. He was a shepherd, and was slain by his brother Cain from jealousy because his sacrifice was accepted while Cain's was rejected. Several of the fathers, among others Sts. Chrysostom, and Augustine, regard him as a type of Christ.

Abelard (ab'e-lärd), or **ABAILARD**, PETER, a celebrated scholastic teacher, born near Nantes in Brittany, in 1079. He made extraordinary progress with his studies, and, ultimately eclipsing his teachers, he opened a school of scholastic philosophy near Paris, which attracted crowds of students from the neighboring city. His success in the fiery debates which were then the fashion in the schools made him many enemies, among whom was Guillaume de Champeaux, his former teacher, chief of the cathedral school of Notre Dame and the most advanced of the Realists. Abelard succeeded his adversary in this school (in 1113), and under him were trained many men who afterwards rose to eminence, among them being the future Pope Celestin II, Peter Lombard, and Arnold of Brescia. While he was at the height of his popularity, and in his fortieth year, he became infatuated with a passion for Héloïse—then only eighteen years of age—niece of Fulbert, a canon of Paris. Obtaining a home in Fulbert's house under the pretext of teaching Héloïse philosophy, their intercourse at length became apparent, and Abelard, who had retired to Brittany, was followed by Héloïse, who there gave birth to a son. A private marriage took place, and Héloïse returned to her uncle's house, but refusing to make public her marriage (as likely to spoil

Abelard's career), she was subjected to severe treatment at the hands of her uncle. To save her from this Abelard carried her off and placed her in a convent at Argenteuil, a proceeding which so incensed Fulbert that he hired ruffians who broke into Abelard's chamber and subjected him to a shameful mutilation. Abelard, filled with grief and shame, became a monk in the abbey of St. Denis, and Héloïse took the veil. When time had somewhat moderated his grief he resumed his lectures; but trouble after trouble overtook him. His theological writings were condemned by the Council of Soissons, and he retired to an oratory called the Paraclete, subsequently becoming head of the abbey of St. Gildas-de-Rhuys in Brittany. For a short time he again lectured at Paris (1136), but his doctrines again brought persecution on him, and St. Bernard had him condemned by the council of Sens and afterwards by the pope. Abelard did not long survive this, dying at St. Marcel, near Chalon-sur-Saône, in 1142. Héloïse, who had become abbess of the Paraclete, had him buried there, where she herself was afterwards laid by his side. Their ashes were removed to Paris in 1800, and in 1817 they were finally deposited beneath a mausoleum in the cemetery of Père la Chaise. Abelard is credited with the invention of a new philosophical system, midway between Realism and Nominalism. A complete edition of his works was published by Cousin (2 vols., Paris, 1849-59), and the letters of Abelard and Héloïse have been often published in the original and in translations.

Abelite, **ABELIAN** (ā'bel-it, a-bel'i-an), a member of a religious sect in Africa which arose in the fourth century after Christ. They married, but lived in continence, after the manner, as they maintained, of Abel, and attempted to keep up the sect by adopting the children of others. Also one of a sect which flourished about 1745 in Greifswald, Germany.

Abenakis, see *Abnakis*.

Abencerrages (ab-en-ser'a-jez), a powerful and distinguished Moorish family of Granada, the chief members of which, thirty-six in number, are said to have been massacred in the Alhambra by the king Abu-Hassan (latter half of the fifteenth century) on account of the attachment of his sister to one of them—a legend which has furnished the subject of many poems both Arabic and Spanish, and formed the basis for Chateaubriand's *Aventures du dernier des Abencérages*.

Aben Ezra (ā'ben ez'ra), a celebrated Jewish rabbi, born at Toledo about 1002, traveled in pursuit of knowledge in England, France, Italy, and Greece, and is supposed to have died in Rhodes about 1174. He particularly distinguished himself as a commentator on Scripture.

Abensberg (ā'bēns-berĕ), a Bavarian manufacturing town with 2200 inhabitants; celebrated for Napoleon's victory over the Austrians, 20th April, 1809.

Abeoku'ta. See *Abbeokuta*.

Aber (ab'er), a prefix in Celtic geographical proper names signifying the mouth or entrance of a river into the sea, or into another stream. It is used chiefly in Wales and Scotland, having the same meaning as *inver*.

Aberavon (ab'er-ā'von), a small industrial town in Glamorganshire, Wales, near the mouth of the Avon in Swansea Bay, embracing Aberavon proper and its harbor Port Talbot. There are collieries, iron works, tin and copper works, etc. Pop. 10,506.

Abercrombie (ab'er-krum-bē), **JOHN**, M.D., a Scottish writer on medical and moral science, and an eminent physician, born in Aberdeen, 1781, died at Edinburgh in 1844. He graduated at the university of Edinburgh in 1803, and subsequently pursued his studies in London, returning to Edinburgh in 1804, where he acquired an extensive practice as a physician. Apart from medical treatises, he is known from his *Inquiries concerning the Intellectual Powers* and his *Philosophy of the Moral Feelings*.

Abercromby (ab'er-krum'bi), or **ABERCROMBIE**, **JAMES** (1706-81), a British general, born at Glassbaugh, Scotland. After being promoted to the rank of major-general he was sent to America in 1756 and became commander-in-chief of the British and colonial forces in 1758, replacing General Loudon. He was totally incompetent. In July of 1758 he was defeated in an attack on Ticonderoga (q. v.), losing heavily in men. He had assembled 20,000 men at Albany for the attack. Montcalm, in command of the French forces, had less than 4000 men with which to oppose the overwhelming forces of Abercromby. It should have been an easy victory for the English, but after losing 2000 men, Abercromby became panic-stricken and, although his army still outnumbered that of Montcalm more than three to one, he turned tail and ran away as if from a superior force. He was superseded by Sir

Abercromby

Jeffrey Amherst (q. v.), who recaptured Ticonderoga (q. v.) and Crown Point (q. v.). Returning to England, he became a member of Parliament, supporting the colonial policies of George III.

Abercromby, PATRICK, a Scottish historical writer and antiquary, born at Forfar, 1656, date of death uncertain. Educated at St. Andrews and abroad, he took the degree of M.D., and practised as a physician in Edinburgh. In 1685 he was appointed physician to James II. His chief work is *Martial Achievements of the Scots Nation*, 2 vols.

Abercromby, SIR RALPH, a British general, born in 1734 in Clackmannanshire, Scotland. He entered the army in 1756 as cornet in the Third Dragoon Guards; and gradually passed through all the ranks of the service until he became a major-general in 1787. He served as lieutenant-general in Flanders, 1793-95, and was then appointed commander-in-chief of the forces in the West Indies, where he captured the islands of Grenada, St. Lucia, St. Vincent, and Trinidad, with the settlements of Demerara and Essequibo. On his return in 1798 he was appointed commander-in-chief in Ireland; and he afterwards held a corresponding command in Scotland. His next and concluding service was in the expedition to Egypt in 1801. He was killed in battle.

Aberdare (ab-er-dâr'), a town of South Wales, in Glamorganshire, pleasantly situated at the junction of the Cynon and Dare, 4 miles southwest of Merthyr-Tydfil, with extensive coal and iron mines in the vicinity. Has large iron and tin works. Pop. 50,844.

Aberdeen (ab-er-dên'), a royal and parliamentary burgh of Scotland, in the county of the same name, on the left bank of the Dee at its entrance into the North Sea, mainly situated on several slight eminences rising above the river. It is one of the oldest towns in Scotland. Constituted a royal burgh by William the Lion, 1179, it was burned by the English in 1336, but soon rebuilt, when it was called *New Aberdeen*. The streets are generally spacious and regular, the houses built of fine grayish-white granite. It has many handsome public buildings, as the County and Municipal Buildings, Marischal College, Grammar School, Infirmary, Arts School, Music Hall Buildings, etc. There is a tidal harbor of about 18 acres, and a dock 28 acres in extent. The harbor entrance is protected by a pier 2,600 feet long, and a breakwater 1,050 feet long. The shipping trade is extensive. Among the in-

Aberdeen

dustries are woolen, cotton, jute, and linen factories, paper works, shipbuilding yards, and granite works. Pop. 163,891.

—OLD ABERDEEN, a small but ancient town and royal burgh, lies about a mile north of the new town, between it and the river Don. Its chief buildings are King's College and St. Machar's Cathedral. The cathedral, now used as the parish church, was commenced about 1357. Over the Don is a fine old Gothic bridge of one arch, erected, according to some accounts, by Robert Bruce.—THE

COUNTY OF ABERDEEN forms the northeastern portion of Scotland, and is bounded on the east and north by the North Sea. Area, 1,955 square miles. It is divided into six districts (Mar, Formartine, Buchan, Alford, Garioch, and Strathbogie), and is generally hilly, there being in the southwest some of the highest mountains in Scotland. Its most valuable mineral is granite, large quantities of which are exported. The principal rivers are the Dee and the Don, both of which enter the sea at the town of Aberdeen. Cereals (except wheat) and other crops succeed well, and the number of acres under cultivation is nearly double that of any other Scottish county. Great numbers of cattle are fattened and sent to London and the south. On the banks of the upper Dee is situated Balmoral, a favorite residence of Queen Victoria. Pop. 304,400.—ABERDEEN UNIVERSITY, as now constituted, derives its origin from two different foundations; one, the University and King's College (Old Aberdeen), founded in 1494 by Bishop Elphinstone, the other, Marischal College and University (New Aberdeen), founded in 1593 by Geo. Keith, Earl Marischal, by a charter ratified by act of parliament. These were incorporated into the University of Aberdeen in 1860. The constitution of the university is similar to that of Edinburgh and the other Scottish universities. The library numbers over 80,000 volumes. The university unites with that of Glasgow in sending one member to parliament.

Aberdeen, a city, county seat of Brown co., South Dakota, 320 miles west of Minneapolis, served by the Great Northern and other railroads, the principal jobbing and distributing point in a large territory. There are large wholesale houses, general machinery agencies and manufactures of candy, metal work, machine-shop and foundry products, flour, etc. Pop. 14,500.

Aberdeen, a city of Chehalis county, Washington, on N. shore of Gray's Harbor, 54 miles W. of Olympia. Lumbering and salmon-fishing are

important industries, and oil, coal and iron are found in the vicinity. There are large saw and shingle mills, foundry and machine shops and other industries. The population, 3747 in 1900, was 17,500 in 1913.

Aberdeen, GEORGE HAMILTON GORDON, EARL OF, British statesman, born in 1784; died in 1860. He began his diplomatic life in 1801 as attaché to Lord Cornwallis's embassy to France, which resulted in the signing of the treaty of Amiens. In 1806 he entered parliament as a Scottish representative peer, and in 1813 was intrusted with a successful mission to Austria for the purpose of inducing the emperor to join the coalition of sovereigns against Bonaparte. In 1814 he was created a British peer, and in 1828 he became foreign secretary under the Duke of Wellington's administration, and in 1841 in that of Sir Robert Peel. On the death of Peel in 1850 he became regarded as the leader of the Conservative free-trade party, and on the fall of the Derby ministry in 1852 he returned to office as head of a coalition ministry. The principal event which marked his administration was the Crimean war; but the bad management of this irritated the country, and the ministry resigned in 1855. This event marks the close of Lord Aberdeen's public career.

Abergavenny (generally pron. ab-er-gā'ni), a town of England, in Monmouthshire. It manufactures woollens and shoes, and has a considerable trade, there being extensive coal and iron mines in the vicinity. Pop. 8511.

Abernethy (ab-er-neth'i), JOHN, an eminent English surgeon, of somewhat eccentric habits, born in 1764 in London, a pupil of the celebrated John Hunter. In 1787 he became assistant surgeon to St. Bartholomew's Hospital, and shortly after lecturer on anatomy and surgery. In 1815 he was elected principal surgeon, and under his auspices the hospital attained a celebrity which it had never before enjoyed. He published *Surgical Observations; The Constitutional Origin and Treatment of Local Diseases; and Lectures*, explanatory of Hunter's opinion of the vital processes, besides smaller essays. He died in 1831.

Aberration (ab-er-ra'shun), in astronomy, the difference between the true and the observed position of a heavenly body, the result of the combined effect of the motion of light and the motion of the eye of the observer caused by the annual or diurnal motion of the earth; or of the motion of light and that of the body from which the light pro-

ceeds. When the auxiliary cause is the annual revolution of the earth round the sun it is called *annual aberration*, in consequence of which a fixed star may appear as much as 20".4 from its true position; when the auxiliary cause is the diurnal rotation of the earth on its axis it is called *diurnal aberration*, which amounts at the greatest to 0".3; and when the auxiliary cause is the motion of the body from which the light proceeds it is called *planetary aberration*—Mental aberration, a departure from the normal mental condition.—In optics the term is used to denote the deviation of the rays of light when refracted unequally by a lens or reflected by a mirror. It is of two kinds, spherical and chromatic. Spherical aberration results in a blurring or lack of definition of the object viewed, due to the curvature of the surface of the lens or mirror used to produce the image of the object. This is not a serious defect and in practice may be treated as a negligible factor. Chromatic aberration arises from the different refrangibilities of the rays composing white light when passing through a single lens and produces an indistinct image with prismatically colored edges. This defect is corrected in practice by means of achromatic lenses which are compound lenses formed of lenses of different kinds of glass, as of crown and flint glass, and whose action depends upon the fact that there is no essential relation between refraction and dispersion. (See these nouns.) In the eye these aberrations are partially eliminated by the iris and the crystalline lens.

Aberystwyth (ab-er-ist'with), a seaport and fashionable watering-place of Wales, county of Cardigan, on Cardigan Bay. There is here a University College occupying a handsome Gothic building. Pop. 8412.

Abhorrrers (ab-hor'rers), a name given in the reign of Charles II of England, 1679-80, to members of the Court party who signed addresses to the Crown, abhorring the petitions presented by certain of Shaftesbury's adherents who were termed variously Petitioners, Excluders, Addressers, Protestants, Country Party. These Addressers prayed the King for an immediate assembly of Parliament in order that the Exclusion Bill against the Duke of York might be proceeded with and that certain measures might be carried out to further the interests of the Protestant cause. The Abhorrrers later were given the name of Tories and the Addressers the name of Whigs.

Abib (a'bib), the first month of the Jewish ecclesiastical year and the seventh of the civil year, corresponding

to the latter part of March and the first of April. Also called *Nisan*.

Abies (ab'i-es), a genus of coniferous trees. See *Fir* and *Spruce*.

Abilene (ab'i-lēn), a city of Texas, the capital of Taylor co., 161 miles west of Fort Worth. It is an important shipping point for grain and cattle, and has cotton gins, oil mill and cotton compress, also flour and planing mills, creamery, etc. It is surrounded by cotton, grain and fruit farms. Pop. 12,000.

Ab'ingdon, a town of England, in Berkshire, 50 miles north-west of London, on the right bank of the Thames. It was an important place in Anglo-Saxon times, and Offa, king of Mercia, had a palace in it. Pop. 6810.

Abiogenesis (a-bi-ō-jen'e-sis), the doctrine or hypothesis that living matter may be produced from non-living; spontaneous generation. See *Generation* (*Spontaneous*).

Abipones (ab-i-pōn'ez), an Indian tribe of South America, dwelling in the Gran Chaco district of Paraguay. The hostility of the Spaniards forced them finally to move southward to the territory between Santa Fé and St. Iago.

Abjuration, OATH OF, an oath which by an English act passed in 1701 had to be taken by all holders of public offices, clergymen, teachers, members of the universities, and lawyers, abjuring and renouncing the exiled Stuarts: superseded in 1858 by a more comprehensive oath, declaring allegiance to the present royal family.—*Abjuration of the realm* was an oath that a person guilty of felony, and who had taken sanctuary, might take to go into exile, and not return on pain of death.

Abkhasia (āb-khā'se-ī), a Russian district, at the western extremity and south of the Caucasus, between these mountains and the Black Sea. The Abkhasians form a race distinguished from their neighbors in various respects. At one time they were Christians, but latterly adopted Mohammedanism. Recently many of them have migrated into Turkish territory.

Abnakis (ab-na'kēs), a confederation of Algonquin Indian tribes in Maine and New Brunswick, hostile to the English, who defeated them and forced them to take refuge in Canada in 1724. A small body of them still live in Maine and others in Quebec.

Abington, a town in Plymouth Co., Mass. It has machine shops and boot and shoe manufactories. Pop. (1910) 5455.

Abney, SIR WILLIAM DE WIVELESLEE, an English physicist, born

1844; noted for his work in photography and spectroscopy. He was president of the Royal Astronomical Society, 1893-96.

Abo (a-bō), a town and port in Russian Finland. Population 39,238.

Abolitionists (ab-ō-lī'shun-ists), a party in the United States before the Civil war, which strongly opposed the continuation of slavery and demanded its abolition. After 1830 it spread rapidly and some of its doctrines were adopted by the Republican party when organized in 1856. It was known officially by the title of Liberty Party and ceased to exist after the Civil War.

Aboll'a, an ancient military garment worn by the Greeks and Romans: opposed to the toga or robe of peace.

Abomasum (ab-ō-mā'sum), ABOMA'SUS, the fourth stomach of ruminating animals, next to the omasum or third stomach.

Abomey (ab-ō-mā) or AGBOMEY, the capital of the former kingdom of Dahomey, in West Africa, in a fertile plain, near the coast of Guinea. Pop. est. 15,000-30,000.

Aborigines (ab-ō-rīj'l-nēz), the same given in general the earliest known inhabitants of a country, those who are supposed to have inhabited the land from the beginning (*L. ab-origine*).

Abortion (a-bōr'shun), in medicine, the expulsion of the fetus before it is capable of independent existence. This may take place at any period of pregnancy before the completion of the twenty-eighth week. A child born after that time is said to be *premature*. Abortion may be the result of the general debility or ill health of the mother, of a plethoric constitution, of special affections of the uterus, of severe exertions, sudden shocks, etc. Various medicinal substances, generally violent emmenagogues or drastic medicines, are believed to have the effect of provoking abortion, and are sometimes resorted to for this purpose. Attempts to procure abortion are punishable by law in all civilized states.—The term is applied in botany to denote the suppression by non-development of one or more of the parts of a flower, which consists normally of four whorls—namely, calyx, corolla, stamens, and pistil.

Aboukir (ā-bō-kēr'; ancient *Cantopus*), a small village on the Egyptian coast, 10 miles east of Alexandria. In Aboukir Bay took place the naval battle in which Nelson annihilated a French fleet on the night of 1st and 2d August, 1798, thus totally destroying the

naval power of France in the Mediterranean. Near this place on 25th July, 1799, Napoleon defeated the Turks under Mustapha; and on March 8, 1801, Sir Ralph Abercromby effected the landing of a British army against the French.

Abou-Simbel. See *Ipsambul*.

About (a-bû), EDMOND FRANÇOIS VALENTIN, a French novelist and miscellaneous writer, born in 1828, died in 1885. He was educated at the Lycée Charlemagne and the École Normale, Paris; was sent at government expense to the French school at Athens; on his return to Paris devoted himself to literature. Principal novels: *Tolla*, *Le Roi des Montagnes*, *Germaine*, *Madelon*, *Le Fellah*, *La Vieille Roche*, *L'Infame*, *Les Mariages de Province*, *Le Roman d'un Brave Homme*, etc.; miscellaneous works: *La Grèce Contemporaine*, *La Question Romaine*, *La Prusse en 1860*, *Rome Contemporaine*, etc. He was in his later years elected a member of the Academy. About wrote in a bright, humorous, and interesting style, and his novels have been very popular.

Abracadabra (a-bra-ca-dab'ra), a word of eastern origin used in incantations. When written on paper so as to form a triangle, the first line containing the word in full, the one below it omitting the last letter, and so on each time until only one letter remained, and worn as an amulet, it was supposed to be an antidote against certain diseases.

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Abraham (â'bra-ham), originally ABRAM, the ancestor of the Hebrews appears in Genesis as a native of Ur of the Chaldees, probably in Babylonia. He migrated with his wife Sarah and his nephew Lot to Canaan, where for many years he led a nomadic life. His two sons, Isaac and Ishmael, were, according to Genesis, the progenitors of the Jews and Arabs, respectively.

Abraham, HEIGHTS OF PLAINS OF. See *Quebec*.

Abraham à Santa Clara, a German pulpit orator, real name ULRICH MEGERLE, born in 1642. As a preacher he acquired so great a reputation that in 1669

he was appointed court-preacher in Vienna, where he died in 1709. His sermons are full of homely, grotesque humor, often of coarse wit, and impartial severity towards all classes of society.

Abraham-men, originally a set of mendicant lunatics from Bethlehem Hospital, London; but as many assumed, without right, the badge worn by them the term came to signify an impostor who traveled about the country seeking alms, under the pretense of lunacy.

Ab'ramis, a genus of fishes. See *Bream*.

Abrantes (â-brân'tes), a fortified town of Portugal, on the right bank of the Tagus (here navigable), 73 miles N. E. of Lisbon, with which it carries on an active trade. Pop. about 8000.

Abrantes, DUKE OF. See *Junot*.

Abraxas (a-braks'as), or ABRASAX STONES, the name given to stones or gems found in Syria, Egypt, and elsewhere, cut into almost every variety of shape, but generally having a human trunk and arms, with a cock's head, two serpents' tails for the legs, etc., and the word Abraxas or Abrasax in Greek characters engraved upon them. They appear to have been first used by the Gnostic sect, and eventually came to be used as talismans.

Abrogation (ab-rô-zâ'shun), the repealing of a law by a competent authority.

Abroma (a-brô'ma), a genus of small trees, natives of India, Java, etc., one species of which, *A. augusta*, has a bark yielding a strong white fiber, from which good cordage is made.

Abrus (ab'rus), a genus of papilionaceous plants, order Leguminosæ, one species of which, *Abrus precatorius*, a delicate twining shrub, a native of the East Indies, and found also in tropical parts of Africa and America, has round, brilliant scarlet seeds, used to make necklaces and rosaries. Its root is sweetish and mucilaginous, and is used as a substitute for licorice under the name of *Indian licorice*.

Abruzzi (â-brut'sè), division of Italy on the Adriatic, between Umbria and the Marches on the north, and Apulia on the south, comprising the provinces of Chieti, Teramo and Aquila, which along with Campobasso, in Molise, form the present-day government (compartimento).

Abruzzi, DUKE OF, a prince of the house of Savoy, son of Amadeus, ex-King of Spain, first cousin of

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King of Italy and an Arctic and mountain explorer, was born January 20, 1873. He is an officer of the Italian navy. In 1897 he made the first ascent of Mount St. Elias and in 1900 penetrated nearer the North Pole than any previous explorer, reaching 86° 33' N. lat., north of Frans Joseph Land. He subsequently ascended a high peak in Africa and in 1900 attempted to scale Mount Godwin Austen in the Himalayas. This cliff (28,250 feet) is the second highest known. Abruzy reached a little over 24,000 feet, at which height he was compelled to give up the attempt.

Absalon, or AXEL, a Danish prelate, statesman, and warrior, born in 1128; died 1201 or 1202. He became the intimate friend and counselor of his sovereign, Waldemar I, who appointed him Archbishop of Lund. He cleared the sea of the Slavonic pirates who had long infested it, secured the independence of the kingdom by defeating a powerful fleet of the Emperor Barbarossa, and built the castle of Axelborg, the nucleus of Copenhagen. Turning his thoughts to literature, he caused the History of Denmark to be written by Saxo Grammaticus and Svend Aagesen.

Abscess (ab'ses), any collection of purulent matter or pus formed in some tissue or organ of the body, and confined within some circumscribed area, of varying size, but always painful and often dangerous.

Absinth, French ABSINTHE (äb-sant), a liqueur consisting of an alcoholic solution strongly flavored with an extract of several sorts of wormwood, all of anise, etc. When taken habitually, or in excess, its effects are very pernicious. It is a favorite drink of the Parisians.

Absolution (ab-sö-lü'shun), remission of a penitent's sins in the name of God. It is commonly maintained that down to the twelfth century the priests used only what is called the *recatory formula*, 'May God or Christ absolve thee,' which is still the form in the Greek Church; whereas the Roman Catholic uses the expression, 'I absolve thee in the name of our Lord Jesus Christ,' basing this power on the authority of the New Testament. This theory of absolution was confirmed by the Council of Trent. The passages of Scripture on the basis of which the Roman Catholic Church lays down its doctrine of absolution are such as Matt. xvi, 19; xviii, 18; John xx, 23. Three forms of absolution survive in the Anglican Prayer Book, and in the Lutheran Church private confession together with certain forms of absolution existed after the Reformation.

Absorbents (ab-sörb'ents), the system of minute vessels by which the nutritive elements of food and other matters are carried into the circulation of vertebrate animals. The vessels consist of two different sets, called respectively *lacteals* and *lymphatics*. The former arise from the digestive tract, the latter from the tissues generally, both joining a common trunk which ultimately enters the circulatory system. Absorbents in medicine are substances such as chalk, charcoal, etc., that absorb or suck up excessive secretion of fluid or gas.

Absorption (ab-sörp'shun), in physiology, one of the vital functions by which the materials of nutrition and growth are absorbed and conveyed to the organs of plants and animals. In vertebrate animals this is done by the lymphatics and lacteals, in plants chiefly by the roots. See *Absorbents*.

In physics, *absorption of color* is the phenomenon observed when certain colors are retained or prevented from passing through transparent bodies; thus pieces of colored glass are almost opaque to some parts of the spectrum, while allowing other colors to pass through freely.

Abstraction (ab-strak'shun), the operation of the mind by which it disregards part of what is presented to its observation in order to concentrate its attention on the remainder. It is the foundation of the operation of generalization, by which we arrive at general conceptions. In order, for example, to form the conception of a horse, we disregard the color and other peculiarities of the particular horses observed by us, and attend only to those qualities which all horses have in common. In rising to the conception of an animal we disregard still more qualities, and attend only to those which all animals have in common with one another.

Abt, FRANZ, German musical composer, born 1819; died 1885; noted for his many popular songs.

Abu (a-bü), a granitic mountain of India in Sirohi state, Rajputana, rising precipitously from the surrounding plains, its top forming a picturesque and varied tract 14 miles long and 2 to 4 broad; highest point 5653 ft. It is a hot-weather resort of Europeans, and is the site of two most beautiful Jain temples.

Abu-Bekr (a'bü-bek'er), or FATHER OF THE VIRGIN, the father-in-law and first successor of Mohammed. His right to the succession was unsuccessfully contested by Ali, Mohammed's son-in-law, and a schism took place, which divided the Mohammedans into the two great sects of Sunnites and Shiites,

the former maintaining the validity of Abu-Bekr's and the latter that of Ali's claim.

Abu Klea (abū-kle'a), a group of wells, surrounded by steep, black mountains, about 120 miles from Khartoum, in the Soudan, where, on the 17th January, 1885, Sir Herbert Stewart, with 1500 men, defeated the Mahdi's troops, numbering 10,000.

Abulfaragius (a - būl - fā-rā'ji-us), GREGORY, a distinguished scholar, a Jew by birth (hence the name of *Barhebræus*, often given him), author of numerous works in Arabic and Syriac, was born in Armenia in 1226; died in 1286. About 1264 he was ordained bishop of Guba, afterwards of Aleppo, and about 1264 was appointed primate of the Jacobite Christians. His principal work is a *History of the World*, from the creation to his own day.

Abulfeda (a-būl-fē'da), Arab writer, Prince of Hamah, in Syria, of the same family that had produced Saladin, famous as a historian and geographer, was born at Damascus 1273; died 1331. His most important works are his *History of the Human Race* (the portion from the birth of Mohammed to his own time being valuable), and *The True Situation of Countries*.

Abutilon (a-bū'ti-lon), a genus of plants, order *Malvacea*, sometimes called Indian mallows, inhabiting the East Indies, Australia, Brazil, Siberia, etc. Several of them yield a valuable hemp-like fibre, as *A. indicum* and *A. avicennæ*. The latter, now a troublesome weed in the United States, has been recommended for cultivation.

Abydos (a-bi'dus). (1). An ancient city of Asia Minor, on the Hellespont, at the narrowest part of the strait, opposite Sestos. Leander, say ancient writers, swam nightly from Abydos to Sestos to see his loved Hero—a feat in swimming accomplished also by Lord Byron.—(2). An ancient city of Upper Egypt, about 6 miles west of the Nile, now represented only by ruins of temples, tombs, etc. It was celebrated as the burying-place of the god Osiris, and its oldest temple was dedicated to him. Here, in 1818, was discovered the famous *Abydos tablet*, now in the British Museum, and containing a list of the predecessors of Rameses the Great, which was supplemented by the discovery of a similar historical tablet in 1864.

Abyssal Animals (a-bis'sal), marine animal types found at depths of 2000 fathoms and more. Some of these organisms, especially fishes and crustaceans, are blind while others are provided with excep-

tionally large eyes. These animals show a high development of tactile organs, and a striking characteristic is their uniformity of body coloring, dark red being common to many orders of the invertebrates, a fact that has caused some speculation among naturalists as to whether the red rays of sunlight may not penetrate to these abysmal recesses. These deep-sea animals are of strictly carnivorous habit, as vegetable forms cannot exist at such depths, owing to the low temperature, a little above freezing point, and the enormous pressure, which is 9000 pounds to the square inch at soundings of 3000 fathoms. Many of these abyssal forms possess phosphorescent organs, but it is uncertain to how high a degree of emitting light their power is developed.

Abyssinia (a-bis-sin'i-a) (Arabic *Habash*), a country of Eastern Africa, which, roughly speaking, may be said to extend from lat. 6° to 15° N. and lon. 35° to 43° E.; having Eritrea on the N. E., the Soudan on the N. W., the Danakil country and Somali on the E., Somali and the Galla country on the S. E., and British East Africa on the S. and W.; total area about 400,000 sq. m.; chief divisions Tigré, Amhara, and Shoa. It is, as a whole, an elevated region, with a general slope to the northwest. The more marked physical features are a series of tablelands, of various and often of great elevations, and numerous masses or ranges of high and rugged mountains, dispersed over the surface in wild confusion. Along the deep ravines that divide the plateaux rush numerous streams, which impart great fertility to the plains and valleys below. The mountains in various parts of the country rise to 12,000 and 13,000 feet, while some of the peaks are over 15,000 feet (Ras Dashan being 15,160), and are always covered with snow. The principal rivers belong to the Nile basin, the chief being the impetuous Tacazzé ('the Terrible') in the north, and the Abai in the south, the latter being really the upper portion of the Blue Nile. The principal lake is Lake Tzana or Dembea (from which issues the Abai), upwards of 6000 feet above the sea, having a length of about 45 and a breadth of 35 miles. Round this lake lies a fertile plain, called the granary of the country.—According to elevation there are several zones of vegetation. Within the lowest belt, which reaches an elevation of 4800 feet, cotton, wild indigo, acacias, ebony, baobabs, sugar-canes, coffee-trees, date-palms, etc., flourish, while the larger animals are lions, leopards, elephants, rhinoceroses, hippopotamuses, jackals, hyenas, numerous an-

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telopes, monkeys, and crocodiles. The middle zone, rising to 9000 feet, produces the grains, grasses, and fruits of southern Europe, the orange, the vine, peach, apricot, the bamboo, sycamore-tree, etc. The principal grains are millet, barley, wheat, maize, and teff, the latter a small seed, a favorite breadstuff of the Abyssinians. Two, and in some places three, crops are obtained in one year. All the domestic animals of Europe, except swine, are known. There is a variety of ox with immense horns. The highest zone, reaching to 14,000 feet, has but little wood, and generally scanty vegetation, only the hardier corn-plants being grown; but oxen, goats, and long-wooled sheep find abundant pasture.—The climate is as various as the surface, but as a whole is temperate and agreeable; in some of the valleys the heat is often excessive, while on the mountains the weather is cold. In certain of the lower districts malaria prevails.—The chief mineral products are sulphur, iron, copper, coal, and salt, the latter serving to some extent as money.—There has been a great intermixture of races in Abyssinia. What may be considered the Abyssinians proper seem to have a blood-relationship with the Bedouin Arabs. The complexion varies from very dark through different shades of brown and copper to olive. The figure is usually symmetrical. Other races are the black Gallas from the south; the Falashas, who claim descent from Abraham, and retain many Jewish characteristics; the Agows, Gongas, etc. The great majority of the people profess Christianity, belonging, like the Copts, to the sect of the Monophysites. Their religion consists chiefly in the performance of empty ceremonies, and gross superstition as well as ignorance prevails. The head of the church is called the Abuna ('our father'), and is consecrated by the Coptic patriarch of Alexandria. Geez or Ethiopian is the language of their sacred books; it has long ago ceased to be spoken. The chief spoken language is the Amharic; in it some books have been published. Mohammedanism appears to be gaining ground in Abyssinia, and in respect of morality the Moslems stand higher than the Christians. A corrupt form of Judaism is professed by the Falashas.—The bulk of the people are devoted to agriculture and cattle-breeding. The trade and manufactures are of small importance. A good deal of common cotton cloth and some finer woven fabrics are produced. Leather is prepared to some extent, silver filigree work is produced, and there are manufactures of common articles of iron and brass, coarse black pot-

tery, etc. A small foreign trade used to be carried on through Massowa, on the Red Sea (now in the hands of the Italians), the principal exports being hides, coffee, honey, wax, gum, ivory, etc., the imports textile fabrics, fire-arms, tobacco, etc.—The Abyssinians were converted to Christianity in the fourth century, by some missionaries from Alexandria. In the sixth century the power of the sovereigns of their kingdom, which was generally known as Ethiopia, had attained its height; but before another had expired the Arabs had invaded the country, and obtained a footing. For several centuries subsequently the kingdom continued in a distracted state, being now torn by internal commotions and now invaded by external enemies (Mohammedans and Gallas). To protect himself from the last the Emperor of Abyssinia applied, about the middle of the sixteenth century, to the King of Portugal for assistance, promising, at the same time, implicit submission to the pope. The solicited aid was sent, and the empire saved. The Roman Catholic priests endeavored to induce the emperor and his family to renounce the tenets and rites of the Coptic Church, and to adopt those of Rome. This attempt, however, was resisted by the ecclesiastics and the people, and ended, after a long struggle, in the expulsion of the Catholic priests about 1630. The kingdom gradually fell into a state of anarchy, and was broken up into several independent states. An attempt to revive the power of the ancient kingdom of Ethiopia was commenced about the middle of the present century by King Theodore. He introduced European artisans, and went to work wisely in many ways, but his cruelty and tyranny counteracted his politic measures. In consequence of a slight, real or fancied, which he had received at the hands of the British government, he threw Consul Cameron and a number of other British subjects into prison, in 1863, and refused to give them up. To effect their release an army of nearly 12,000 men, under Sir Robert (afterwards Lord) Napier, was dispatched from Bombay in 1867. After being defeated in a battle Theodore delivered up the captives and shut himself up in Magdala, which was taken by storm on the 13th April, Theodore being found among the slain. The withdrawal of the British was followed by fighting for supremacy among the chiefs, Kasa (who assumed the name of King Johannes) gaining control of the northern provinces and Menelek of Shoa. Later Johannes became supreme and in 1881 assumed the title of emperor (*negus*

negus—king of kings), having under him the Kings of Shoa and Gojam. Advantage was taken of the troubles in Abyssinia by the Egyptians in the north and the Gallas in the south to acquire additional territory at its expense. Egypt annexed the region round Massowa, Abyssinia being shut out from the sea. Johannes was succeeded in 1889 by Menelek II, who placed the kingdom under an Italian protectorate. Disputes about the text of the treaty followed, hostilities broke out and the Italians met with complete defeat in 1896, the country being freed from foreign control. Menelek died in 1913 and was succeeded by his 15-year-old grandson, Prince Lidj Yasu. In September, 1916, Lidj was deposed and his aunt, Waizeru Zaudita, daughter of Menelek II, became Empress of Abyssinia. In 1917 a revolution was started with the object of overthrowing the Empress, but it was quelled. The population is estimated at 8,000,000.

Acacia (a-cá'shi-a), a genus of plants, nat. order Leguminosæ, sub-order Mimosæ, consisting of trees or shrubs with compound pinnate leaves and small leaflets, growing in Africa, Arabia,



Acacia (*Acacia seyal*).

the East Indies, Australia, etc. The flowers, usually small, are arranged in spikes or globular heads at the axils of the leaves near the extremity of the branches. The corolla is bell or funnel shaped; stamens are numerous; the fruit is a dry, unjointed pod. Several of the

species yield gum arabic and other gums; some have astringent barks and pods, used in tanning. *A. catechu*, an Indian species, yields the valuable astringent called catechu: *A. dealbata*, the wattle-tree of Australia, from 15 to 30 feet in height, is the most beautiful and useful of the species found there. Its bark contains a large percentage of tannin, and is hence exported. Some species yield valuable timber; some are cultivated for the beauty of their flowers.

Academy (a-cad'e-mi), an association for the promotion of literature, science, or art; established sometimes by government, sometimes by the voluntary union of private individuals. The name academy was first applied to the philosophical school of Plato, from the place where he used to teach, a grove or garden at Athens which was said to have belonged originally to the hero Academus. Academies devote themselves either to the cultivation of science generally or to the promotion of a particular branch of study, as antiquities, language and the fine arts. The most celebrated institutions bearing the name of academies, and designed for the encouragement of science, antiquities, and language respectively, are the French Académie des Sciences (founded by Colbert in 1666), Académie des Inscriptions (founded by Colbert in 1663), and Académie Française (founded by Richelieu in 1635), all of which are now merged in the National Institute. The oldest of the academies instituted for the improvement of language is the Italian Accademia della Crusca (now the Florentine Academy), formed in 1582, and chiefly celebrated for the compilation of an excellent dictionary of the Italian language, and for the publication of several carefully prepared editions of ancient Italian poets. In Britain the name of academy, in the more dignified sense of the term, is confined almost exclusively to certain institutions for the promotion of the fine arts, such as the Royal Academy of Arts and the Royal Scottish Academy. The Royal Academy of Arts (usually called simply the Royal Academy) was founded in London in 1768, 'for the purpose of cultivating and improving the arts of painting, sculpture, and architecture. The Royal Scottish Academy of Painting, Sculpture, and Architecture was founded in 1826 and incorporated in 1838. It consists of thirty academicians and twenty associates. The Royal Hibernian Academy at Dublin was incorporated in 1823 and reorganized in 1861. It consists of thirty members and ten associates. The American Philosophical Society, the oldest

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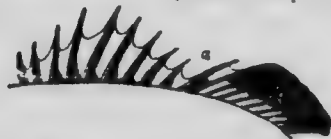
scientific institution in America, was organized in 1744, in Philadelphia. The Academy of Natural Sciences of Philadelphia was organized in 1812, and the Academy of Fine Arts in 1805. The American Academy of Arts and Sciences, incorporated in 1780, is located at Boston, as also the Society of Natural History. The Connecticut Academy of Arts and Sciences was organized in New Haven in 1799. The New York Academy of Sciences was incorporated as the Lyceum of Natural History in 1818. The Peabody Academy of Sciences, Salem, Mass., was endowed by George Peabody in 1867. The Smithsonian Institution, Washington, D. C., was incorporated by Congress, in 1846. The National Academy of Sciences was founded at Washington, 1856. The American Academy of Arts and Letters was organized in 1904, with a limited membership of 50, of persons who had made notable achievements in art, music or literature. There are academies in Cincinnati, St. Louis, Chicago, San Francisco, New Orleans and other cities.

Acadia (a-kā'di-a; French *Acadie*), the French name of Nova Scotia. It received its first colonists from France in 1604, being then a possession of that country, but it passed to Britain, by the Peace of Utrecht, in 1713. In 1755, 18,000 of the French inhabitants were forcibly removed from their homes on account of their hostility to the British, an incident on which is based Longfellow's *Evangeline*. See *Nova Scotia*.

Acajutla (ā-kā-hōt'la), the port of both Sonsonate and San Salvador in Salvador; connected with these cities by a narrow-gauge railway; the gateway for a constantly increasing trade.

Acanthaceæ (a-kan-tha'se-ē), or ACANTHADS, a natural order of dicotyledonous herbaceous plants or shrubs, with opposite leaves and monopetalous corolla, mostly tropical; species about 1400. See *Acanthus*.

Acanthopteri, ACANTHOPTERYGII (a-kan-thop-te-rij'i-i)



a, b, c, Spines of the dorsal, anal, and ventral fins of Acanthopterygii.

(Gr. *akantha*, a spine, *pterygion*, a fin), a group of fishes, distinguished by the fact that at least the first rays in each fin exist in the form of stiff spines; it includes the perch, mullet, mackerel, gurnard, wrasse, etc.

Acanthus (a-kan'thus), a genus of herbaceous plants or shrubs, order, Acanthaceæ, mostly tropical, two species of which, *A. mollis* and *A. spinosus* (the



Acanthus of Corinthian Capital.

bear's-breech or brankursine), are characterized by large white flowers and deeply indented, shining leaves. They

are favorite ornamental plants.—In architecture the name is given to a kind of foliage decoration said to have been suggested by this plant, and much employed in Greek and later styles.

Acapulco (ā-kā-pōl'kō), a seaport of Mexico, on the Pacific, with a capacious, well-sheltered harbor; a coaling station for steamers, but with great trade. Pop. 5800.

Acarida (a-kar'i-da), a division of the *Arachnida*, including the mites, ticks, and water-mites. See *Mite*.

Acarnania (ak-ar-nā'ni-a), the most westerly portion of Northern Greece, together with *Ætolia* now forming a nomarchy. The Acarnanians of ancient times were behind the other Greeks in civilization, living by robbery and piracy. Pop. 175,000.

Acarus (ak'a-rus, pl. acari), the genus to which the mite belongs.

Accad or AK'KAD, the N. W. division of ancient Babylonia, Sumir forming the S. E. The Accadians were the dominant people at the time of the earliest records. They had descended from the mountainous region of Elam on the east, and the Assyrians ascribed to them the origin of Chaldean civilization and writing. This race is believed to have belonged to the Turanian family, from the character of its language. What is known of them has been learned from the cuneiform inscriptions.

Acceleration (ak-sel-e-rā'shun), the increase of velocity which a body acquires when continually acted upon by a force in the direction of its motion. A body falling from a height is one of the most common instances of acceleration.—ACCELERATION OF THE MOON, the increase of the moon's mean angular velocity about the earth, the moon now moving rather faster than in

ancient times. This phenomenon has not been fully explained, but it is known to be partly owing to the slow process of diminution which the eccentricity of the earth's orbit is undergoing, and from which there results a slight diminution of the sun's influence on the moon's motions.—**DIURNAL ACCELERATION OF THE FIXED STARS**, the apparent greater diurnal motion of the stars than of the sun, arising from the fact that the sun's apparent yearly motion takes place in a direction contrary to that of its apparent daily motion. The stars thus seem each day to anticipate the sun by nearly 3 minutes 56 seconds of mean time.

Accent (ak'sent), a term used in several senses. In English it commonly denotes superior stress or force of voice upon certain syllables of words, which distinguishes them from the other syllables. Many English words, as *as'pi-ra'tion*, have two accents, a secondary and primary, the latter being the fuller or stronger. Some words, as *in-com'pre-hen'si-bil'ity*, have two secondary or subordinate accents. When the full accent falls on a vowel, that vowel has its long sound, as in *vo'cal*; but when it falls on a consonant, the preceding vowel is short, as in *hab'it*. This kind of accent alone regulates English verse as contrasted with Latin or Greek verse, in which the metre depended on *quantity* or length of syllables. In books on elocution three marks or accents are generally made use of, the first or *acute* (') showing when the voice is to be raised, the second or *grave* (`), when it is to be depressed, and the third or *circumflex* (^) when the vowel is to be uttered with an undulating sound. In some languages there is no such distinct accent as in English (or German), and this seems to be now the case with French.—In music, accent is the stress or emphasis laid upon certain notes of a bar. The first note of a bar has the strongest accent, but weaker accents are given to the first notes of subordinate parts of the bars, as to the third, fifth, and seventh in a bar of eight quavers.

Accentor (*Accentor modularis*), or **HEDGE ACCENTOR**, a genus of seed and insect-eating passerine birds, very common throughout Europe.

Acceptance (ak-sep'tans), in law, the act by which a person binds himself to pay a bill of exchange drawn upon him. (See *Bill*.) No acceptance is valid unless made in writing on the bill, but an acceptance may be either absolute or conditional, that is, stipulating some alteration in the amount or date of payment, or some con-

dition to be fulfilled previous to payment.

Accessory (ak-ses'a-ri, ak'se-sä-ri) or **ACCESSORY**, in law, a person guilty of an offense by connivance or participation, either before or after the act committed, as by command, advice, concealment, etc. An *accessary before the fact* is one who procures or counsels another to commit a crime, and is not present at its commission; an *accessary after the fact* is one who, knowing a felony to have been committed, gives assistance of any kind to the felon so as to hinder him from being apprehended, tried, or suffering punishment. An *accessary before the fact* may be tried and punished in all respects as if he were the principal. In high treason, all who participate are regarded as principals.

Accidentals (ak-si-den'tals), notes introduced in the course of a piece of music in a different key from that in which the passage they occur is principally written. They are represented by the sign of a sharp, flat, or natural immediately before the note which is to be raised or lowered.

Accipitres (ak-sip'i-tréz), the name given by Linnaeus and Cuvier to the rapacious birds now usually called *Raptores* (which see).

Acclimatization (a-kli-ma-ti-zä-shun), the process of accustoming plants or animals to live and propagate in a climate different from that to which they are indigenous, or the change which the constitution of an animal or plant undergoes under new climatic conditions, in the direction of adaptation to those conditions. The term is sometimes applied to the case of animals or plants taking readily to a new country with a climate and other circumstances similar to what they have left, such as European animals and plants in America and New Zealand: but this is more properly *naturalization* than *acclimatization*.

Accolade (ak-o-läd'; French, from *L. ad, to, collum, the neck*), the ceremony used in conferring knighthood, anciently consisting either in the embrace given by the person who conferred the honor of knighthood or in a light blow on the neck or the cheek, subsequently consisting in the ceremony of striking the candidate with the flat of a naked sword.

Accol'ti, **BENEDETTO**, an Italian lawyer, yer, born at Arezzo in Tuscany in 1415, died 1466. He was secretary to the Florentine republic, 1459 and author of a work on the Crusades which

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Accommodation Bill

Acetylene

is said to have furnished Tasso with mat-
ter for his *Jersusalem Delivered*.

Accommodation Bill, a bill of exchange drawn and accepted to raise money on, and not given, like a genuine bill of exchange, in payment of a debt, but merely intended to accommodate the drawer.

Accommodation Ladder, a light ladder hung over the side of a ship at the gang-way to facilitate ascending from or descending to boats.

Accompaniment (a-kum'pa-ni-ment), in music, is that part of music which serves for the support of the principal melody (solo or obligato part). This can be executed either by many instruments, by a few, or by a single one.

Accordion (a-kor'di-un), a keyed musical wind instrument similar to the concertina, being in the form of a small box, containing a number of metallic reeds fixed at one of their extremities, the sides of the box forming a folding apparatus which acts as a bellows to supply the wind, and thus set the reeds in vibration, and produce the notes both of melody and harmony.

Accra (ük'kra), a British settlement in Africa, capital of the colony of Gold Coast, about 75 miles east of Cape Coast Castle. Exports, gold dust, ivory, gums, palm-oil; imports, cottons, cutlery, firearms, etc. Pop. about 20,000.

Accrington (ak'kring-tun), a municipal bor. of Lancashire, England, 19 miles north of Manchester, with large cotton factories, print-works, and bleach-fields, and coal-mines adjacent. Pop. 45,031.

Accumulator. See *Electric Storage Battery*.

Aceldama (a-sel'dā-ma; "the field of blood"), in Acts i, 13 the name given to the field purchased by Judas Iscariot with the money he had received for the betrayal of Christ. The traditional site (now Hakel-Dum), south of Jerusalem on the northeast slope of the 'Hill of Evil Counsel,' was used as a burial-place for Christian pilgrims from the 6th century A.D. till as late as 1697. Near it is an ancient charnel-house, partly rock-cut and partly of masonry, said to be the work of Crusaders.

Acephala (a-sef'a-la), in zoology, the headless Mollusca or those which want a distinct head, corresponding to those that have bivalve shells and are also called *Lamellibranchiata*.

Acer (ä'ser), the genus of plants (natural order *Aceraceæ*) to which belong the maples.

Acerra (ä-cher'a), a town in South Italy, 7 miles northeast of Naples, the see of a bishop. Here are sulphur and mineral springs. Pop. 16,443.

Acerraderos (ath - er - ra-dä'ros), a town in the province of Santiago, Cuba, where General Shafter and Admiral Sampson arranged with General Garcia, the Cuban leader, for the co-operation of the Cuban forces in the Santiago campaign, 1898.

Acetabulum (as-e-tab'ü-l u m), an anatomical term applied to any cup-like cavity, as that of a bone to receive the protuberant end of another bone, the cavity, for instance, that receives the end of the thigh-bone.

Acetates (as'e-täts), salts of acetic acid. The acetates of most commercial or manufacturing importance are those of aluminium and iron, which are used in calico-printing; of copper, which as verdigris is used as a color; and of lead, best known as sugar of lead. The acetates of potassium, sodium, and ammonium, of iron, zinc, and lead, and the acetate of opium are employed in medicine.

Acetic Acid (a-set'ik, a-sē'tik), an acid produced by the oxidation of common alcohol and of many other organic substances. Pure acetic acid has a very sour taste and pungent smell, burns the skin, and is poisonous. From freezing at ordinary temperatures (58° or 59°) it is known as *glacial acetic acid*. Vinegar is simply dilute acetic acid, and is prepared by subjecting wine or weak spirit to the action of the air; also from malt which has undergone vinous fermentation. Acetic acid, both concentrated and dilute, is largely use in the arts, in medicine, and for domestic purposes. See *Vinegar*.

Acetic Ethers, compounds consisting of acetates of alcohol radicals. Common acetic ether is a colorless, volatile fluid, and is a flavoring constituent in many wines. It is made artificially by distilling a mixture of alcohol, oil of vitriol, and acetate of sodium.

Acetones (as'e-tōns), or Ketones, are the aldehydes of the secondary alcohols. A series of these is known, of which acetone is the type. It is a limpid liquid, with a taste like peppermint, a solvent for gums and also gun-cotton. By distilling it with bleaching powder chloroform is produced.

Acetylene A gas compounded of carbon and hydrogen, indicated by the formula C₂H₂. It is without color and has a very acid and penetrating odor until the sulphuretted and phosphorettered hydrogen has been removed. Its

density is 0.92. It is less poisonous than carbon monoxide and even coal gas. Condensation into a liquid state can be effected by cold or pressure; the latter method showing that at a temperature of 0° C. a pressure of 2.53 atmospheres suffices, the pressure required increasing with the rise and decreasing with the fall of the temperature. It will become liquid under normal atmosphere pressure at -82° C. Acetylene is of great importance commercially, chiefly for illumination and in the industrial arts for welding and cutting metals by means of the oxygen-acetylene blow-pipe. The combination of these gases in proper proportion burns with a very intense heat and is applicable to the working of metals with a high melting point, such as iron and steel. Acetylene gas for this purpose is now supplied in convenient form in steel cylinders of various capacities. These cylinders are filled with dissolved acetylene gas by packing them with a porous substance soaked with a liquid, such as acetone, which has the property of dissolving acetylene. Gas is pumped into a cylinder under pressure until it contains about 150 times its own volume and slowly released by the solvent as it is used. See *Oxy-Acetylene Welding*.

Acetylene gas is produced through the decomposition of carbide by water, either by dropping carbide into water or water on carbide. The former is the most approved method and the safest, as the carbide is thrown into a considerable mass of water and the chances of explosive effects are greatly minified, whereas in the latter method the water dropping in the mass of carbide on irregular evolution of gas may result, but the danger of an explosion is increased. On the purity of the acetylene also safety depends in large measure. There are various methods of purifying it, but the chief consideration is to obtain a pure carbide. Acetylene is highly explosive in certain mixtures, as with air or oxygen; even friction on the surface of the vessels containing such mixtures may effect an explosion. It is also explosive when isolated and pure if it is kept under pressure of more than two atmospheres. In the liquid form it is extremely dangerous, but it may be stored in solution in acetone, and, if the pressure used in dissolving it is not very great, an explosion could only occur in the gaseous volume above the surface of the liquid, the dissolved portion would not contribute to the explosion. It has been rather commonly supposed that when acetylene is brought into contact with metallic copper or its alloys an explosive compound forms; this, however, is demonstrated to be a false assumption. The gas may be stored in any metallic container. Owing to the high carbon content in acetylene, it

evolves great heat in combustion. To this quality is due its power as an illuminant, the temperature being high enough to maintain incandescence of the carbon particles in the flame."

The use of acetylene for lighting purposes is considerable. It is employed in street lamps, as well as for domestic use and for motor vehicles, but the wider use of the gas has probably been checked by the fear of its explosive quality. It is an economical light, but special burners are required which admit the mixture of a certain quantity of air with the gas before the point is reached where combustion takes place. Besides pure acetylene, mixtures of this gas and nitrogen, marsh gas or carbonic acid gas may be used. In addition acetylene can be used to enrich coal gas and other combustible gases, but the cost of carbide limits this use. A product of acetylene is *di-iodoform*, C_3I_4 , which results from passing the gas into a solution of iodine. This product has the advantage over the ordinary iodoform in the absence of the irritating odor of the antiseptic while possessing equal antiseptic value. Acetylene combines directly with nitrogen under the action of electric sparks and forms prussic acid. Alcohol is also derivable from it, through an ethylene acted upon by sulphuric acid and water, the ethylene itself resulting from the heating of the acetylene with hydrogen. This process, however, is too expensive for ordinary commercial use.

In the chemical sense acetylene is an unsaturated compound, inasmuch as it combines with bromine and other halogens without losing its own elements. Similarly it combines with hydrogen, and, by heating a mixture of these, ethylene gas may be obtained, as is indicated above, and by the action of hydrogen in the presence of 'platinum black,' or finely divided platinum, the ethylene is transformed into ethane gas. Another important use of acetylene is in the manufacture of sugar according to a German patent. Mentions should be made of another product of acetylene, *copper acetylide*, which results from passing acetylene into a solution of a cuprous salt, as cuprous chloride, in which some ammonia is present.

Achæans (a-kē'anz), one of the four races into which the ancient Greeks were divided. In early times they inhabited a part of Northern Greece and of the Peloponnesus, known as Achæia. They are represented by Homer as a brave and warlike people.

1. A confederacy or league, known as the Achæan League, existed among the twelve towns of this region. It was dissolved about 288 B. C. by Antigonus Gordatus.

2. A political federation of Achæans

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and other Greek cities, 281 to 146 B. C., said to be the most perfect type of federal government which has been handed down by antiquity. It was destroyed by the Romans in 146 B. C., and with it fell the last stronghold of liberty in Greece.

Achæmenidæ (a-k-ē-men'i-d-ē), a dynasty of ancient Persian kings, being that to which the great Cyrus belonged.

Achaia (a-kā'ya), a small Greek district on the north coast of the Peloponnesus, famed in ancient times for its production of fruits, oil and wine, still largely produced in the modern Achaia, one of the departments of the kingdom of Greece; chief town of Patras, known in ancient days as Patræ. The Achaians (Achæans) were the ruling people of the Peloponnesus. Achaia, or Achæa, in the southeastern part of Thessaly, is supposed to have been the home of Achilles. It is in ancient Achaia that the best example of the federal system is found. The Achæan league has a representative assembly which for many years held sway. (See *Achæans*.)

Achalzich (ä-häl'tsēh), a fortified town of Russia, in Transcaucasia, 70 miles east of the Black Sea. Pop. 18,000.

Achard (äh'art), FRANZ KARL, a German chemist, born in 1753; died 1821, principally known by his invention (1789-1800) of a process for manufacturing sugar from beet-root.

Achard (ä-shär), LOUIS AMÉDÉE EUGÈNE, born 1814; died 1875, a French journalist, novelist, and playwright. Best known as a novelist; wrote the novels *Belle Rose*, *La Chasse royale*, *Château en Espagne*, *Robe de Nessus*, *Chânes de fer*, etc.

Achates (a-kä'tēz), a companion of Æneas in his wanderings subsequent to his flight from Troy. He is always distinguished in Virgil's *Æneid* by the epithet *fidus*, 'faithful,' and has become typical of a faithful friend and companion.

Acheen, or **ACHIN** (ä-chēn'), a native state of Sumatra, with capital of same name, in the northwestern extremity of the island, now nominally under Dutch administration. Though largely mountainous, it has also undulating tracts and low, fertile plains. By treaty with Britain the Dutch were prevented from extending their territory in Sumatra by conquest; but this obstacle being removed, in 1871 they proceeded to occupy Acheen. It was not till 1879, however, after a great waste of blood and treasure, that they obtained a general recognition of their authority. But they

have not been able to establish it firmly, and in 1885 were forced to evacuate part of the Acheenese territory, with considerable loss in men and guns. In the seventeenth century Acheen was a powerful state, and carried on hostilities successfully against the Portuguese, but its influence decreased with the increase of the Dutch power. The principal exports are rice and pepper. Area, 20,500 sq. miles; population, according to recent calculation, 110,000 (by some estimated to be much larger).

Achelous (ak-e-lō'us), now *Aspropotamo*, the largest river of Greece rising on Mount Pindus, separating Ætolia and Acarnania, and falling into the Ionian Sea.

Achenbach (ä'hen-bäch), ANDREAS, was a distinguished and prolific German landscape and marine painter, born in 1815; died in 1910.—OSWALD ACHENBACH, born 1827; died 1905, brother of above, was also a distinguished landscape painter.

Achene, **ACHENIUM** (a-kēn', a-kē-ni-um), in botany a small, dry carpel containing a single seed, the pericarp of which is closely applied but separable, and which does not open when ripe. It is either solitary or several acheneia may be placed on a common receptacle, as in the buttercup.



Achene—Lettuce and Radunculus.

Acheron (ak'e-ron), the ancient name of several rivers in Greece and Italy, all of which were connected by legend with the lower world. The principal was a river in Epirus, which passes through Lake Acherusia and flows into the Ionian Sea. Homer speaks of Acheron as a river of the lower world, and late Greek writers use the name to designate the lower world.

Achiar, **ATCH'AR**, an Indian condiment made of the young shoots of the bamboo pickled.

Achievement (a-chēv'ment), in heraldry, a term which may be applied to the shield of armorial bearings generally, but is usually applied to the shield or hatchment which is affixed to the house of persons lately deceased, to denote their rank and station.

Achill (ak'il), or **EAGLE ISLAND**, the largest island on the Irish coast; separated from the mainland of Connaught by a narrow sound; area, 51,521 acres, mostly irreclaimable bog. The chief occupation of the natives is fishing. Pop. 4920.

Achillæa, the milfoil genus of plants.

Achilles (a-kil'ez), a Greek legendary hero, the chief character in Homer's *Iliad*. His father was Peleus, ruler of Phthia in Thessaly, his mother the sea-goddess Thetis. When only six years of age he was able to overcome lions and bears. His guardian, Cheiron the Centaur, having declared that Troy could not be taken without his aid, his mother, fearing for his safety, disguised him as a girl, and introduced him among the daughters of Lycomedes of Scyros. Her desire for his safety made her also try to make him invulnerable when a child by anointing him with ambrosia, and again by dipping him in the river Styx, from which he came out proof against wounds, all but the heel, by which she had held him. His place of concealment was discovered by Odysseus (Ulysses), and he promised his assistance to the Greeks against Troy. Accompanied by his close friend, Patroclus, he joined the expedition with a body of followers (Myrmidons) in fifty ships, and occupied nine years in raids upon the towns neighboring to Troy, after which the siege proper commenced. On being deprived of his prize, the maiden Briseis, by Agamemnon, he refused to take any further part in the war, and disaster attended the Greeks. Patroclus now persuaded Achilles to allow him to lead the Myrmidons to battle dressed in his armor. He was slain by Hector and Achilles vowed revenge on the Trojans, whom he attacked and drove back to their walls, slaying them in great numbers, chased Hector, who fled before him three times round the walls of Troy, slew him, and dragged his body at his chariot-wheels, but afterwards gave it up to Priam, who came in person to beg for it. He then performed the funeral rites of Patroclus, with which the *Iliad* closes. He was killed in a battle at the Scaean Gate of Troy by an arrow from the bow of Paris, which struck his vulnerable heel. In discussions on the origin of the Homeric poems the term *Achilleid* is often applied to those books (I, viii, and xi-xxii) of the *Iliad* in which Achilles is prominent, and which some suppose to have formed the original nucleus of the poem.

Achilles Tendon, or **TENDON OF ACHILLES**, the strong tendon which connects the gastrocnemius muscles of the calf of the leg with the heel, and may be easily felt with the hand. The origin of name will be understood from above article.

Achilles Tatius (a-kil'ez ta'shi-us), a Greek romance writer of the fifth century A. D., belonging

to Alexandria; wrote a love story called *Adventures of Leucippé and Cleitophon*.

Achimenes (a-kim'e-néz), a genus of tropical American plants, with scaly underground tubers, nat. order Gesneraceæ, now cultivated in European greenhouses on account of their ornamental character.

Achlamydeous (ak-la-mid'e-us), in botany, wanting the floral envelopes; that is, having neither calyx nor corolla, as the willow.

Achor (a'kor), a disease of infants, in which the head, the face, and often the neck and breast become incrustated with thin, yellowish or greenish scabs, arising from minute, whitish pustules, which discharge a viscid fluid.

Achromatic (Gr. *a*, priv., and *chrōma*, *chrōmatos*, color), in optics, transmitting colorless light; that is, light not decomposed into the primary colors, though having passed through a refracting medium. A single convex lens does not give an image free from the prismatic colors, because the rays of different color making up white light are not equally refrangible, and thus do not all come to a focus together, the violet, for instance, being nearest the lens, the red farthest off. If such a lens of crown-glass, however, is combined with a concave lens of flint-glass—the curvatures of both being properly adjusted—as the two materials have somewhat different optical properties, the latter will neutralize the chromatic aberration of the former, and a satisfactory image will be produced. Telescopes, microscopes, etc., in which the glasses are thus composed are called *achromatic*.

Acid (as'id, Latin, *acidus*, sour), a name popularly applied to a number of compounds, solid, liquid, and gaseous, having more or less the qualities of vinegar (itself a diluted form of acetic acid), the general properties assigned to them being a tart, sour taste, the power of changing vegetable blues into reds, of decomposing chalk and marble with effervescence, and of being in various degrees neutralized by alkalies. An acid has been defined as a substance containing hydrogen, which is partly or fully replaceable by a metal when presented in the form of a hydrate. The acid is distinguished as being *monobasic*, *dibasic*, or *tribasic*, according to the number of hydrogen atoms replaced.

Acidimeter (as-id-im'e-ter), an instrument for ascertaining the strength of acids.

Acierage (â'sê-ér-âj) (Fr. *acier*, steel), a process by which an engraved copper plate or an electrottype

from an engraved plate of steel or copper has a film of iron deposited over its surface by electricity in order to protect the engraving from wear in printing. By this means an electrotpe of a fine engraving, which, if printed directly from the copper, would not yield 500 good impressions, can be made to yield 3000 or more; and when the film of iron becomes so worn as to reveal any part of the copper, it may be removed and a fresh coating deposited so that 20,000 good impressions may be got.

Acipenser (as-i-pen'sér), the genus of cartilaginous ganoid fishes to which the sturgeon belongs.

Aci Reale (ä'chë rä-ä'lä) a seaport of Sicily, northeast of Catania, a well-built town, with a trade in corn, wine, fruit, etc. In its vicinity are the cave of Polyhemus and grotto of Galatea. Pop. 35,418. (See next article.)

Acis (ä'sis), according to Ovid, a beautiful shepherd of Sicily, loved by Galatea, and crushed to death by his rival the Cyclops Polyphemus. His blood, flowing from beneath the rock which crushed him, was changed into a river bearing his name.

Aclin'ic Line (Gr. priv. *a*, *klinō*, to incline), the magnetic equator, an irregular curve in the neighborhood of the terrestrial equator, where the magnetic needle balances itself horizontally, having no dip.

Acne (ak'në), a skin disease, consisting of small, hard pimples, usually on the face, caused by congestion of the follicles of the skin.

Acolytes (ak'o-lits), in the ancient Latin and Greek churches, persons of ecclesiastical rank next in order below the subdeacons, whose office it was to attend to the officiating priest. The name is still retained in the Anglican and R. Catholic Churches.

Aconcagua (ä-kon-kä'gwä), a province, a river, and a mountain of Chile. The peak of Aconcagua, rising to the height of 23,080 feet is one of the highest summits of the western hemisphere. Area of province, about 6000 sq. miles. Pop. 131,255.

Aconite (ak'o-nit; *aconitum*), a genus of herbaceous plants, nat. order Ranunculaceæ, represented by the well-known wolf's bane or monk's-hood, and remarkable for their poisonous properties and medicinal qualities, being used internally as well as externally in rheumatism, gout, neuralgia, fever, etc. See next article.

Aconitine (ä-kon'i-tin), an alkaloid extracted from monk's-

hood and some other species of aconite; used medicinally, though a virulent poison.

Aconguija (ä-kon-gë'hä), a range of mountains in the Argentine Republic; the name also of a single peak 17,000 feet high.

Acorn (ä'korn), the fruit of the different kinds of oak. The acorn-cups of one species are brought from the Levant under the name of *valonia*, and used in tanning.

Acorn-shell. See *Balanus*.

Acorus (ak'o-rus), a genus of plants, including the sweet-flag. See *Sweet-flag* and *Calamus*.

Acos'ta, GABRIEL, afterwards URIEL, a Portuguese of Jewish descent, born 1590, died by his own hand 1647. Brought up a Christian, he afterwards embraced Judaism. Having gone to Amsterdam, where he attacked the practices of the Jews, and denied the divine mission of Moses, he suffered much persecution at the hands of the Jews. He left an autobiography, published in 1687, under the title *Exemplar Vitæ Humanæ*.

Acotyledons (ä-kot-i-lë'duns), plants not furnished with cotyledons or seed-lobes. They include ferns, mosses, sea-weeds, etc., and are also called flowerless plants or cryptogams.

Acoustics (ä-kou'stiks), the science of sound. It teaches the cause, nature, and phenomena of such vibrations of elastic bodies as affect the organ of hearing, the properties and effects of different sounds, including musical sounds or notes, and the structure and action of the organ of hearing, etc. The propagation of sound is analogous to that of light, both being due to vibrations which produce successive waves, and Newton was the first to show that its propagation through any medium depended upon the elasticity of that medium. Regarding the intensity, reflection, and refraction of sound, much the same rules apply as in light. Though the vibrations of sound are longitudinal, in direction, while those of light are transverse, the rapidity of audible sound vibrations varies from about 24 to about 40,000 per second. In ordinary cases of hearing the vibrating medium is air, but all substances capable of vibrating may be employed to propagate and convey sound. When a bell is struck its vibrations are communicated to the particles of air surrounding it, and from these to particles outside them, until they reach the ear of the listener. The intensity of sound varies inversely as the square of the distance of the body sounding from the ear. Sound

travels through the air at the rate of about 1090 feet per second; through water at the rate of about 4700 feet. Sounds may be musical or non-musical. A musical sound is caused by a regular series of exactly similar pulses succeeding each other at precisely equal intervals of time. If these conditions are not fulfilled the sound is a noise. Musical sounds are comparatively simple, and are combined to give pleasing sensations according to easy numerical relations. The loudness of a note depends on the degree to which it affects the ear; the pitch of a note depends on the number of vibrations to the second which produce the note; the timbre, quality, or character of a note depends on the body or bodies whose vibrations produce the sound, and is due to the form of the paths of vibrating particles. The gamut is a series of eight notes, which are called by the names Do, Re, Mi, Fa, So, La, Ti, Do, and the numbers of vibrations which produce these notes are respectively proportional to 24, 27, 30, 32, 36, 40, 45, 48. The numerical value of the interval between any two notes is given by dividing one of the above numbers corresponding to the higher note by the number corresponding to the lower note. The intervals from Do to each of the others are called a *second*, a *major third*, a *fourth*, a *fifth*, a *sixth*, a *seventh*, and an *octave*, respectively. The interval from La to Do is a *minor third*. An interval of $\frac{9}{8}$ is a *major tone*; $\frac{10}{9}$ is a *minor tone*; $\frac{11}{10}$ is called a *limma*. The properties of sound were mathematically investigated by Bacon and Galileo, but it remained for Newton, Lagrange, Euler, Laplace, Helmholtz, etc., to bring the science to its present state.

Acqui (ák'wè), a town of Northern Italy 18 miles s.s.w. of Alessandria, a bishop's see. It has warm sulphurous baths, which were known to the Romans, and which yet draw a great many visitors. Pop. 13,786.

Acre (á'ker), a standard measure of land, used in the United States and Great Britain and its colonies. The acre consists of 4840 square yards, divided into 4 roods. The old Scotch acre contains 6146.8 square yards, the old Irish acre 7840 square yards.

Acre, a disputed territory in South America, lying on the Aquiri River between Bolivia and Brazil, and of great value as one of the most important rubber-bearing districts. The claim of possession at times nearly led to war between the claimants, until settled by treaty in 1903.

Acre (ancient *Accho* and *Ptolemais*), a seaport of Syria, in Northern

Palestine, on the Bay of Acre, early a place of great strength and importance. Taken from the Saracens under Saladin in 1191 by Richard I of England and Philip of France; bravely defended by the Turks assisted by Sir Sidney Smith in 1799 against Napoleon; in 1832, taken by Ibrahim Pasha; in 1840, bombarded by a British, Austrian, and Turkish fleet, and restored to the Sultan of Turkey. Pop. 11,000.

Acri (á'krè), a town of S. Italy, prov. of Cosenza. Pop. about 13,000.

Acrocephali (a-krò-sef'a-lì), tribes of men distinguished by pyramidal or high skulls.

Acrocorinthus (a-krò-cò-rin'thus), a steep rock in Greece, nearly 1900 feet high, overhanging ancient Corinth, and on which stood the acropolis or citadel, the sacred fountain of Pirene being also here. This natural fortress has proved itself of importance in the modern history of Greece.

Acrogens (-jenz), lit. summit-growers, a term applied to the ferns, mosses, and lichens (cryptogams), as growing by extension upwards, in contradistinction to endogens and exogens.

Acrolein (ak'ro-lìn), the acrid principle produced by the destructive distillation of fatty bodies arising from the decomposition of glycerine. It is a limpid liquid, boiling at 52.4°, its vapor being so irritating that a few drops in a room render the air insupportable. When mixed with a solution of potash or soda this irritating property disappears.

Ac'rolith, an early form of Greek statuary in which the head, hands, and feet only were of stone, the trunk of the figure being of wood draped or gilded.

Acrop'olis (Gr. *akros*, high, and *polis*, a city), the citadel or chief place of a Grecian city, usually on an eminence commanding the town. That of Athens contained some of the finest buildings in the world, such as the Parthenon, Erechtheum, etc.

Acroscopic (a-kros'tik), a poem of which the first or last, or certain other letters of the line, taken in order, form some name, motto, or sentence. A poem of which both first and last letters are thus arranged is called a double acroscopic. In Hebrew poetry, the term is given to a poem, of which the initial letters of the lines or stanzas, were made to run over the letters of the alphabet in their order, as in Psalm cxix.—Acrostics have been much used in complimentary verses, the initial letters giving the name of the person eulogized.

Act, in special senses: (1) In dramatic poetry, one of the principal divisions of a drama, in which a definite and coherent portion of the plot is represented; generally subdivided into smaller portions called *scenes*. The Greek dramas were not divided into acts. The dictum that a drama should consist of five acts was first formally laid down by Horace, and has been generally adhered to by modern dramatists in tragedy. In comedy no such distinction is observed.—(2) Something formally done by a legislative or judicial body; a statute or law passed.—(3) In universities, a thesis maintained in public by a candidate for a degree. See *Act of God*, *of Parliament*, *of Settlement*, etc.

Acta Diurna (L., proceedings of the day), a daily Roman newspaper which appeared under both the republic and the empire.

Actæ'a. See *Baneberry*.

Actæon (ak-tē'un), in Greek mythology, a great hunter, turned into a stag by Artemis (Diana) for looking on her when she was bathing, and torn to pieces by his own dogs.

Acta Eruditorum (L., acts of the learned), the first literary journal that appeared in Germany (1682-1782). Among the contributors, the most distinguished was Leibnitz.

Acta Sanctorum (L., acts of the saints), a name applied to all collections of accounts of ancient martyrs and saints, both of the Greek and Roman Churches, more particularly to the valuable collection begun by John Bolland, a Jesuit of Antwerp in 1643, and which, being continued by other divines of the same order (*Bollandists*), now extends to sixty volumes, the lives following each other in the order of the calendar.

Actinia (ak-tin'i-a), the genus of animals to which the typical sea-anemones belong. See *Sea-anemone*.

Actinism (ak-tin-izm), the property of those rays of light which produce chemical changes, as in photography, in contradistinction to the light rays and heat rays. The actinic property or force begins among the green rays, is strongest in the violet rays, and extends a long way beyond the visible spectrum.

Actinium (ak-tin'ī-um), the name given by Dr. T. P. Phipson in 1881 to a supposed metallic element discovered by him. The existence of this element is not now accepted by chemists, and the name of Actinium was given in

1900 to a radio-active substance discovered by A. Delverne in the decomposition of pitchblende. It gives off the same rays as radium, but its emanation dies away very rapidly. It appears to belong to the iron group of elements.

Actinolite (ak-tin'ō-lit), a mineral nearly allied to hornblende.

Actinograph (ak-tin'ō-graf), an instrument for measuring and recording the variations in the actinic force of the solar rays.

Actinometer (ak-ti-nom'e-tēr), an instrument for measuring the intensity of the sun's actinic rays. See *Actinism*.

Actinozoa (ak-tin'ō-zō'a), or ANTHOZOA, an order of Coelenterate animals, including such polyp-like forms as the corals (except millepores) and sea anemones.

Action (ak'shun), the mode of seeking redress at law for any wrong, injury, or deprivation. Actions are divided into civil and criminal, the former again being divided into real, personal, and mixed.

Actium (ak'shi-um, ak'ti-um), a promontory on the western coast of Northern Greece, not far from the entrance of the Ambracian Gulf (Gulf of Arta), now called La Punta, memorable on account of the naval victory gained here by Octavianus (afterwards the Emperor Augustus) over Antony and Cleopatra, September 2, B.C. 31, in sight of their armies, encamped on the opposite shores of the gulf. Soon after the beginning of the battle Cleopatra fled with sixty Egyptian ships, and Antony basely followed her, and fled with her to Egypt. The deserted fleet was not overcome without making a brave resistance. Antony's land forces soon went over to the enemy, and the Roman world fell to Octavianus.

Act of Congress, a law or statute passed by both houses of the United States Congress and acceded to by the President, or passed over his veto. If pronounced unconstitutional by a decision of the Supreme Court an Act of Congress ceases to be valid.

Act of God, a legal term defined as sudden, and irresistible act of nature, which could not, by any reasonable cause, have been foreseen or resisted. No one can be legally called upon to make good loss arising.

Act of Parliament, a law or statute proceeding from the parliament of the United Kingdom, passed in both houses, and as-

presented to by the king. Acts are either public or private, the former affecting the whole community, the latter only special persons and private concerns. The whole body of public acts constitutes the *statute law*.

Act of Settlement, an act passed by the English parliament in 1701, by which the succession to the throne of the three kingdoms, in the event of King William and Queen Anne dying without issue, was settled on the Princess Sophia, electress of Hanover, granddaughter of James I, and her heirs, with the restriction that they should be Protestants. By this act George I, son of the Princess Sophia, succeeded to the crown on the death of Queen Anne, in 1714.

Act of Uniformity, an English act passed in 1562 enjoining upon all ministers to use the Book of Common Prayer on pain of forfeiture of their livings. See *Nonconformists*.

Acton (ak'tun), a kind of padded or quilted vest or tunic formerly worn under a coat of mail to save the body from bruises, or used by itself as a defensive garment. Jackets of leather or other material plated with mail were also so called. *Gambeson* was an equivalent term.



Quilted Acton of the fifteenth century.

Acton (ak'tun), a name of various places in England, one of them a western suburb of London, with a population of 57,523.

Actor (ak'tur), one who represents some part or character on the stage. Actresses were unknown to the Greeks and Romans in the earliest times, men or boys always performing the female parts. They appeared under the Roman empire, however. Charles II first encouraged the public appearance of actresses in England, though they appear to have been employed on the Continent of Europe much earlier. In Shakespeare's time female parts were performed by men and boys. See *Drama*.

Acts of the Apostles, one of the books of the New Testament, written in Greek by St. Luke, probably in A.D. 63 or 64. It embraces a period of about thirty years, beginning immediately after the resurrection, and extending to the second year of the imprisonment of St. Paul in Rome.

Very little information is given regarding any of the apostles excepting St. Peter and St. Paul, and the accounts of them are far from being complete.

Actuary (ak'tū-a-ri), an accountant whose business is to make the necessary computations in regard to a basis for life assurance, annuities, reversions, etc.

Aculeus (a-kū'lē-us), in botany, a prickly, or sharp-pointed process of the epidermis, as distinguished from a thorn or spine, which is of a woody nature.

Acupressure (akū-presh'ur), a means of arresting bleeding from a cut artery, introduced by Sir James Simpson in 1859, and consisting in compressing the artery above the orifice, that is, on the side nearest the heart, with the middle of a needle (i.e., a needle) introduced through the tissues.

Acupuncture (a-kū-punk'tūr), a surgical operation, consisting in the insertion of needles into certain parts of the body for alleviating pain, or for the cure of different species of rheumatism, neuralgia, eye diseases, etc. It is easily performed, gives little pain, causes neither bleeding nor inflammation, and seems at times of surprising efficacy.

Adagio (Italian; a-dī'jō), a musical term, expressing a slow time, slower than *andante*, but less so than *largo*.

Adāl (a-dāl'), a country in Africa, east of Abyssinia and west of the Gulf of Tajurrah, inhabited by a dark-brown race known as Afar or Danakil, of nomadic habits, Mohammedans in religion.

Adalia (ad-ā-lī'a), a seaport on the south coast of Asia Minor. Pop. est. 26,000-30,000.

Adam (ā-dām), ADOLPHE CHARLES, a French composer, more especially of comic operas; born 1803; died 1856. Wrote *Le Postillon de Longjumeau* and *Le Brasseur de Preston* (Brewer of Preston).

Adam (ad'am), ALBRECHT, a German painter of battles and animals; born 1786; died 1862. Three sons of his have also distinguished themselves as painters, especially FRANZ, born 1815, among whose best pictures are several representing scenes of the Franco-German war; died 1886.

Adam, ALEXANDER, a Scottish classical scholar, born in 1741, became in 1768 rector of the High School of Edinburgh, and died there in 1809. Wrote *Principles of Latin and English Gram-*

Adam

war; *Roman Antiquities*, a useful school-book; *Summary of Geography and History*; *Classical Biography*, etc.

Adam, ROBERT, an eminent Scottish architect, was born in 1728, and died in 1792. In conjunction with his brother James he was much employed by the English nobility and gentry in constructing modern and embellishing ancient mansions. His style, novel at the time, had the serious defect of excessive decoration.

Adam and Eve, the names given in Scripture to our first parents, an account of whom and their immediate descendants is given in the early chapters of Genesis. Cain, Abel, and Seth are all their sons that are mentioned by name; but we are told that they had other sons as well as daughters, and that Adam finally died at the age of 930 years. There are numerous Rabbinical additions to the Scripture narrative of an extravagant character, such as the myth of Adam having a wife before Eve, named *Lilith*, who became the mother of giants and evil spirits. Other legends or inventions are contained in the Koran.

Adam de la Halle, an early French writer and musician; born 1240; died 1287. His *Jeu de Robin et de Marion* may be regarded as the first comic opera ever written.

Adamant (ad'a-mant), an old name for the diamond; also used in a vague way to imply a substance of impenetrable hardness.

Adaman'tine Spar, a name of the mineral corn-dum or of a brownish variety of it.

Adamawa (ä-dä-maw'ä), a region of Central Africa, between lat. 6° and 11° N., and lon. 11° and 17° E.; also called *Fuabina*. Much of the surface is hilly or mountainous, Mount Atlantika being 9,000 or 10,000 feet. The principal river is the Benue. A great part of the country is covered with thick forests. The inhabitants are industrious and intelligent. Cotton and ivory are the chief articles of trade. Chief town and capital Yola.

Adamites (ad'am-its), a name of sects or religious bodies that have appeared at various times: so called because both men and women were said to appear naked in their assemblies, either to imitate Adam in the state of innocence or to prove the control which they possessed over their passions.

Adamnan (ad-am-nan'), St., born in Ireland or Scotland about 624, was elected abbot of Iona in 679, and died there about 703 or 704. He is best known from his *Life of St. Columba*.

Adams

Adams (ad'ama), a village and township, Berkshire co., Massachusetts, 16 miles from Pittsfield. Graylock or Saddle Mountain (3535 feet), the highest point in the state, is in the township. It has manufactures of cotton, wool, iron, paper, etc. Pop. of township 13,026. See *North Adams*.

Adams, CHARLES FRANCIS, American littérateur and statesman, born in 1807, was a son of John Quincy Adams. His youthful years were spent in Europe, partly in England; but he finished his education at Harvard, and afterwards studied law. After serving some years in the Massachusetts legislature he was elected to Congress in 1858. In 1861 he was sent to England as American minister, and showed much tact and ability, under the difficult conditions arising from the Civil war. He edited a complete edition of the works of John Adams, his grandfather, with a biography. He was one of the arbitrators on the Alabama claims. Died in 1886.

Adams, CHARLES FRANCIS, publicist and historian, born in Boston, Mass., May 27, 1835; died March 19, 1915. He graduated at Harvard in 1856, was admitted to the bar in 1858, in 1861 entered the Union Army, and at the close of the war was in command of a regiment of colored cavalry. After the year 1874 he devoted much time to the study of American history, and in 1913 lectured at Oxford University. His works include *Railroads—Their Origin and Problems*, *Richard Henry Dana, Massachusetts—His Historians and His History*, *Life of Charles Francis Adams and Leo at Appomattox and Other Papers*.

Adams, CHARLES KENDALL, instructor and author, born Derby, Vermont, in 1825; graduated at the University of Michigan in 1861, when he became in 1863 assistant professor and in 1868 full professor of history. Was professor of history at Cornell College in 1881-85 and president 1885-92; then president of University of Wisconsin. Author of *Democracy and Monarchy in France*; editor-in-chief of revised edition of Johnson's *Universal Cyclopedia*. Died in 1902.

Adams, JOHN, second president of the United States, was born at Braintree (now Quincy), Massachusetts, October 30, 1735. He was educated at Harvard University, and adopted the law as a profession. His attention was directed to politics by the question as to the right of the English parliament to tax the colonies, and in 1765 he published some essays strongly opposed to the claims of the mother country. As a member of the new American Congress in

1774, 1775, and 1776 he was strenuous in his opposition to the home government, and in organizing the various departments of the colonial government. On 13th May, 1776, he seconded the motion for a declaration of independence proposed by Lee of Virginia, and was appointed a member of committee to draw it up. The Declaration was actually drawn up by Jefferson, but it was Adams who handled it in Congress. In 1778 he went to France on a special mission, and spent in all nine years abroad as representative of his country in France, Holland, and England. After taking part in the peace negotiations, he was appointed, in 1785, the first ambassador of the United States to the court of St. James. He was recalled in 1788, and in the same year elected vice-president of the republic under Washington. In 1792 he was re-elected vice-president, and at the following election in 1796 was chosen president in succession to Washington. His term of office proved a stormy one, and in 1800 he was defeated by the Republican candidate, Thomas Jefferson. Events took place in the administration of Adams that greatly diminished his popularity. He had the consolation, however, of living to see his son president. He died 4th July, 1826, the fiftieth anniversary of the declaration of independence.

Adams, JOHN COUCH, an English astronomer, born in 1819, studied at Cambridge, and was senior wrangler in 1843. His investigations into the irregularities in the motion of the planet Uranus led him to the conclusion that they must be caused by another more distant planet, and the results of his labors were communicated in 1845, to Professor Challis of Cambridge and Sir George Airy, the astronomer royal. The French astronomer Leverrier had been engaged in the same line of research, and had come to substantially the same results, which, being published in 1846, led to the actual discovery of the planet Neptune by Galle of Berlin. Died 1892.

Adams, JOHN QUINCY, sixth president of the United States, son of John Adams, second president, was born 11th July, 1767. Accompanying his father to Europe, he received part of his education there, but graduated at Harvard in 1788. Having adopted the legal profession, in 1791 he was admitted to the bar. Some letters that he wrote having attracted general attention, in 1794 Washington appointed him minister to The Hague. He afterwards was sent to Portugal, and by his father to Berlin. In 1798 he received a commission to negotiate a treaty of commerce with Sweden.

On the accession of Jefferson to the presidency in 1801 he was recalled. The Federalist party (that of his father), which was now declining, had sufficient influence in Massachusetts to elect him to the senate in 1803. On an important question of foreign policy, that of embargo, he abandoned his party, and resigned his seat on this account. He was appointed to the professorship of rhetoric at Cambridge, which he held from 1806 to 1809. In 1809 he went as Minister to Russia. He assisted in negotiating the peace of 1814 with England, and was afterwards appointed resident minister at London. Under Monroe as president he was secretary of state, and succeeded him in the presidency (1825). He was not very successful as president, and at the end of his term was not re-elected. In 1831 he was returned to Congress by Massachusetts, and continued to represent this state till his death (February 23, 1848), his later efforts being chiefly on behalf of the abolitionist party.

Adams, MAUDE, an American actress, born at Salt Lake City, November 11, 1872. She starred in Barrie's *Little Minister* in 1897-8; and later in *Quality Street*, *Peter Pan*, etc.

Adams, SAMUEL, an American statesman, second cousin of President John Adams, was born in Boston, 27th Sept., 1722, and was educated at Harvard College. He early devoted himself to politics, and in connection with the dispute between America and the mother country he showed himself one of the most unwearied, efficient, and disinterested assertors of American freedom and independence. He was one of the signers of the Declaration of 1776, which he labored most indefatigably to bring forward. He sat in Congress eight years, in 1789-94 was lieutenant-governor of Massachusetts, in 1794-97 governor, when he retired from public life. Died 1803.

Adams, SAMUEL HOPKINS, author, born at Dunkirk, N. Y., 1871. Engaged in newspaper and magazine work. Wrote 'The Great American Fraud' and other novels.

Adam's Apple, the popular name of the prominence seen in the front of the throat in man, and which is formed by the portion of the larynx known as the *thyroid cartilages*, one on each side, joining in the front. It contains the larynx, the organ of speech. It is much smaller and less visible in females than in males.

Adam's Bridge, a chain of reefs, sandbanks, &c. islands stretching between India and Ceylon: so called because the Mohammedans believe that when Adam was

Adam's Needle

driven from paradise he had to pass by this way to Ceylon (where is also Adam's Peak).

Adam's Needle, a popular name of the Yucca plant.

Adam's Peak, one of the highest mountains in Ceylon, 45 m. east-southeast of Colombo, conical, isolated, and 7,420 feet high. On the top, a rocky area of 64 feet by 45, is a hollow in the rock 5 feet long bearing a rude resemblance to a human foot, which the Brahmans believe to be the footprint of Siva, the Buddhists that of Buddha, the Mohammedans that of Adam. Devotees of all creeds here meet and present their offerings (chiefly rhododendron flowers) to the sacred footprint. The ascent is very steep, and towards the summit is assisted by steps cut and iron chains riveted in the rock.

Adamson Law. A bill which provided that after Jan. 1, 1917, eight hours should be regarded as a basis of reckoning for a day's pay of men engaged in the operation of railroad trains in interstate commerce (excepting roads less than 100 miles long and electric lines), that they should receive pro rata pay for work in excess of eight hours, and that their rate of compensation should not be changed pending an investigation for from six to nine months of the effect of the eight-hour day upon the railroads by a commission to be appointed by the President.

Adana (äd'ä-nä), an ancient town of southeastern Asia Minor, on the Sihun, which is here navigable, 30 m. from the Mediterranean, well built, and with considerable trade. Pop. estimated at about 50,000, largely Armenians. Many were massacred in 1909 by Mohammedans during the revolutionary movement in Turkey.

Adansonia. See *Baobab*.

Adar (ä'dar), the twelfth month of the Hebrew sacred and sixth of the civil year, answering to part of February and part of March.

Adda (äd'dä, ancient *Addua*), a river of North Italy, which, descending from the Rhätian Alps, falls into Lake Como, and leaving this joins the Po, after a course of about 170 miles.

Adda, a species of lizard, more commonly called skink.

Ad'dams, JANE, social reformer; born Cedarville, Illinois, in 1860; opened in 1889 the social settlement of Hull House, Chicago; has done admirable work in uplifting the poor and ignorant of that city; has lectured on social and

political reform. Author of *Democracy and Social Ethics*, etc.

Addax, a species of African antelope (*Addax nasomaculatus*), of

the size of a large ass, which it resembles. The horns of the male are about 4 feet long, beautifully twisted into a wide-sweeping spiral of two turns and a half, with the points directed outwards. It has tufts of hair on the forehead and throat,



Head of Addax (*Addax nasomaculatus*).

and large, broad hoofs. It inhabits the sandy regions of Nubia and Kordofan, and is also found in Caffraria.

Adder (ad'der), a name often applied to the common viper as well as to other kinds of venomous serpents. See *Viper*.

Adder-pike (*Trachinus vipera*), a small species of the weever fish, called also the Lesser Weever or Sting-fish. See *Weever*.

Adder-stone, the name given in different parts of Britain to certain rounded perforated stones or glass beads found occasionally, and supposed to have a kind of supernatural efficacy in curing the bites of adders. They are believed to have been anciently used as spindle-whorls, that is, a kind of small fly-wheels to keep up the rotatory motion of the spindle.

Adder's-tongue, a species of common fern (*Ophioglossum vulgatum*) whose spores are produced on a spike, supposed to resemble a serpent's tongue.

Adder's-wort, a name of snakeweed or bistort (*Polygonum distorta*), from its supposed virtue in curing the bite of serpents.

Ad'dington, HENRY, Viscount Sidmouth, born in 1755, died 1844. Entered parliament, 1783, as a warm supporter of Pitt. Was elected speaker of the House of Commons, 1789, and in 1801 invited by the king to form an administration, chiefly signalized by the conclusion of the Peace of Amiens. Quarrelled with Pitt, whom he bitterly attacked. Was home secretary from 1812 till 1822, his repressive policy making him remarkably unpopular with the nation at large. Retired from official life in 1824.

Ad'dison, JOSEPH, an eminent English essayist, son of the Rev. Lancelot Addison, afterwards dean of Lichfield, born at Milston, Wiltshire, 1st May, 1672; died 17th June, 1719. He was educated at the Charterhouse, where he became acquainted with Steele, and afterwards at Oxford. He held a fellowship from 1697 till 1711, and gained much praise for his Latin poetry and other contributions to classical literature. He secured as his earliest patron the poet Dryden, who inserted some of his verses in his *Miscellanies* in 1693. A translation of the fourth *Georgic* appeared in the same collection in 1694, and he subsequently translated for it two and a half books of *Ovid*. Dryden also prefixed Addison's prose essay on Virgil's *Georgics* to his own translation of that poem, which appeared in 1697. An early patron of his was Charles Montague, afterwards Earl of Halifax; another was Lord Somers, who procured him a pension of £300 a year to enable him to qualify for diplomatic employments by foreign travels. He spent from the autumn of 1699 to that of 1703 on the Continent, where he became acquainted with Malebranche, Boileau, etc. During his residence abroad his tragedy of *Cato* is supposed to have been written. During his journey across Mount Cenis he wrote his *Letter from Italy*, esteemed the best of his poems, and in Germany his *Dialogues on Medals*, which was not published till after his death. His *Remarks on Several Parts of Italy in the Years 1701-3* was published in 1703. His political friends lost power on the death of William III, but *The Campaign*, a poem on the battle of Blenheim, procured him an appointment as a commissioner of appeal on excise. In 1706 he received an undersecretaryship, in 1707 accompanied Halifax on a mission to Hanover, in 1709 became secretary to the viceroy of Ireland, and keeper of the records. In 1708 he was elected M. P. for Lostwithiel, a seat he exchanged in 1710 for Malmesbury, which place he continued to represent till his death. From October, 1709, to January, 1711, he contributed 75 papers to the *Tatler*, either wholly by himself, or in conjunction with Steele, thus founding the new literary school of the Essayists. For the *Spectator* (2d January, 1711, to 6th December, 1712) he wrote 274 papers, all signed by one of the four letters C, L, I, O. He contributed also to other periodicals; his tragedy of *Cato*, produced April, 1713, ran for twenty nights, and was translated into French, Italian, German, and Latin. On the death of Queen Anne he successively became secretary to the

lords justices, secretary to the Irish viceroy, and one of the lords commissioners of trade. In August, 1716, he married the Countess of Warwick, which marriage is said to have been uncomfortable. He retired from public life, March, 1718, with a pension of £1500 a year. He formed a close friendship with Swift, and was chief of a distinguished literary circle. He had literary quarrels with Pope and Gay, the former of whom in revenge wrote the satire contained in his lines on Atticus in the epistle to Arbuthnot. He also had a paltry quarrel over politics with his ancient comrade Steele. His death took place at Holland House, its cause being dropsy and asthma. He was buried in Westminster Abbey. Of his style as a writer so much has been said that nothing remains to say but to quote the dictum of Johnson, 'Whoever wishes to attain an English style, familiar but not coarse, and elegant but not ostentatious, must give his days and nights to the volumes of Addison.'

Addison's Disease (from Dr. Thomson as Addison, who traced the disease to its source), a fatal disease, the seat of which is the two glandular bodies placed one at the front of the upper part of each kidney, and called *suprarenal capsules*. It is characterized by anæmia or bloodlessness, extreme prostration, and a brownish or olive-green color of the skin. Death usually results from weakness, and commonly within a year.

Address (ad-dres'), **FORMS OF.** The following are the principal modes of formally addressing titled personages or persons holding official rank.

AMBASSADOR.—The title 'Excellency' belongs specially to ambassadors and to United States ministers to a foreign court. Address letters 'His Excellency' (with name or distinctive title following). Begin, 'Sir,' 'My Lord,' according as the ambassador possesses title or not. When personal reference is made, say 'Your Excellency.' An envoy extraordinary or chargé d'affaires, though inferior to an ambassador strictly so called, also, usually receives the title 'Excellency'; and the wives of ambassadors are generally addressed similarly during their husbands' tenure of office and while residing abroad.

ARCHBISHOP.—Address: 'The most Reverend A—B—, D.D.' The wife of an archbishop has no special title.

BISHOP.—Address: 'The Right Rev. Bishop,' or 'The Rt. Rev. A—B—, D.D.' A bishop's wife and family have no special title.

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dinal as such is 'His Eminence.' Begin: 'Your Eminence.'

CLERGYMAN.—The general form of address is 'The Reverend A—B.' Begin: 'Rev. Sir,' or simply 'Sir.'

CONGRESS, MEMBERS OF.—Are addressed generally 'The Honorable A—B—.'

CONSUL.—There is no special form of address to a person as such, though in this country a consul is called 'Honorable.'

DOCTOR.—The initials denoting the particular degree are placed after the usual form of address, whether D.D., LL.D., M.D., D.Sc., etc., 'The Rev. A—, B—, D.D.,' 'A—B, Esq., M.D.' Less formally: 'The Rev. Doctor B—,' 'Doctor A—B.'

DUKE.—Address: 'His Grace the Duke of—.' Begin: 'My Lord Duke'; refer to as 'Your Grace.' All the children of a duke are entitled to be called 'Right Honorable.'

GOVERNORS OF STATES.—Are usually addressed as 'His Excellency.' 'His Excellency A—B—, Governor of —,' or, 'His Excellency the Governor of—,' A lieutenant-governor is called 'Honorable.'

JUDGE.—'His Honor, Judge —' (surname); on the bench referred to as 'Your Honor.'

KING.—Should be addressed as 'The King's Most Excellent Majesty.' Begin: 'Sir,' or 'May it please Your Majesty'; refer to as 'Your Majesty.'

LAWYERS.—Address: 'Esquire,' or 'Mr. A—B—, Esq.' This is a complimentary title given to all holding temporary civil offices, as magistrates, councilmen, etc.

MARRIED LADY.—Has the title Mrs. prefixed to her name in speaking and writing. On being approached in writing or speech by strangers or inferiors, should be addressed as 'Madam,' or 'Dear Madam.' An unmarried lady is addressed as 'Ma'am,' in speaking or writing, except where her name, 'Miss—,' is used. Two or more unmarried ladies are addressed as 'The Misses A—B—,' while 'Mesdames' is plural for 'Madam.'

MAYOR.—Address: 'The Honorable Mayor of —.' Address: 'Sir,' or 'Dear Sir.' Mayors are usually styled 'Honorable'; as 'The Honorable A—B, Mayor of —.'

MEMBER OF HOUSE OF REPRESENTATIVES.—Address: 'Honorable A—B—, M.C.' Begin: 'Sir,' or 'Dear Sir.' A Congressman's wife and family have no title of recognition.

MEMBER OF PARLIAMENT.—Not specially recognized except by adding 'M.P.' to ordinary address: 'A—B—, Esq., M.P.,' 'Sir A—B—, Bart. M.P.'

OFFICERS, MILITARY AND NAVAL.—Their professional rank is put before any title they may independently possess: 'General' or 'Admiral the Right Hon. the Earl of—'; 'Colonel A—B—.'

PRESIDENT (U. S.).—Address: 'His Excellency the President of the United States,' 'His Excellency A—B—, President of the United States.' The Vice-President and ex-presidents are 'Honorable'; 'The Honorable the Vice-President'; 'The Honorable A—B—.'

PRINCE.—Address: 'His Royal Highness the Prince of Wales'; 'His Royal Highness Prince A—' (Christian name). Begin in any case: 'Sir'; refer to as 'Your Royal Highness.'

PRINCESS.—Address: 'Her Royal Highness the Princess of Wales'; 'Her Royal Highness the Princess A—' (Christian name); Begin: 'Madam'; refer to as 'Your Royal Highness.'

PROFESSOR.—A form of address for a public teacher in a university, especially one to whom the title has been formally granted; but should not be employed indiscriminately to any teacher or schoolmaster.

QUEEN.—Address: 'The Queen's Most Excellent Majesty.' Begin 'Madam,' or 'May it please Your Majesty'; refer to as 'Your Majesty.'

Ade, GEORGE, an American author, born at Kurtland, Ind., in 1866. He engaged in newspaper work and wrote humorous sketches; also various plays including *The County Chairman*, *The Sultan of Sulu*, *The College Widow*, etc.

Adel'. See *Adel*.

Adelaide (ad'e-lād), the capital of South Australia, 6 miles east from Port Adelaide (on St. Vincent Gulf), its port, with which it is united by railway, founded in 1836, and named after the queen of William IV. Situated on a large plain, it is built nearly in the form of a square, with the streets at right angles, and is divided into North and South Adelaide, separated by the river Torrens, which is crossed by several bridges, and by means of a dam is converted into a fine sheet of water. The public buildings comprise the Government House, the town hall, the post and telegraph offices, the government offices, courthouses, the houses of legislature, the university, South Australian Institute, etc. There is a complete service of electric cars. Adelaide is connected by railway with Melbourne, and is the terminus of the overland telegraph to Port Darwin. It has a large trade. Pop. (including suburbs), 192,204.

Adelard of Bath, an English philosophical writer of the twelfth century. He traveled through Spain, north of Africa, Greece and Asia Minor, and acquired much knowledge from the Arabs, which he put in systematic shape. Chief works, *Perdifficiles Quaestiones Naturales* and *De Eodem et Diverso*.

Adelsberg (ä'délz-berh), a small town of Southern Austria, in Carniola, midway between Trieste and Laibach, remarkable for the wonderful stalactite cave in its vicinity. The most extended of the ramifications of the cave reaches to over 2 miles from the entrance, at which the river Poik disappears, and is heard rushing below.

Adelung (äd'e-lung), JOHANN CHRISTOPH, a German philologist; born 1732; died 1806. In 1759 he was appointed professor in the Protestant academy at Erfurt, and two years after removed to Leipzig, where he applied himself to the works by which he made so great a name, particularly his German dictionary, *Grammatisch-kritisches Wörterbuch der hochdeutschen Mundart* (Leipzig, 1774-86), and his *Mithridates*, a work on general philology. In 1787 he was appointed librarian of the public library in Dresden—an office which he held till his death.—FRIEDRICH VON ADELUNG, nephew of the above, also distinguished himself as a philologist. Was tutor to the Grand Duke Nicholas, afterwards Emperor of Russia, and became president of the Academy of Sciences at St. Petersburg. Born in 1768; died in 1843.

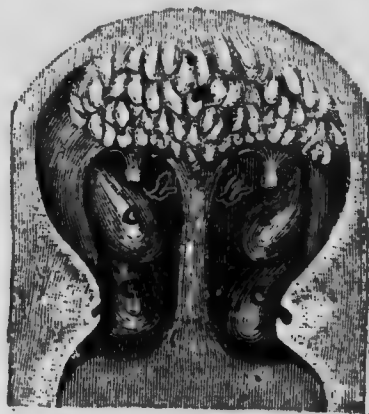
Aden (ä'den) a seaport town and territory belonging to Britain, on the southwest coast of Arabia, in a dry and barren district, the land side being almost entirely closed in by an amphitheater of rocks, and possessing an admirable harbor. Occupying an important military position, Aden is strongly fortified and permanently garrisoned. It is of importance also as a coaling station for steamers, and carries on a large commerce in Arabian coffee, textiles, hides, petroleum, etc. The peninsula on which it stands somewhat resembles the rock of Gibraltar, and has been rendered as formidable. Aden was a Roman colony, and in the middle ages it was a great entrepôt of the Eastern trade. It was acquired by Britain in 1839, after which it was attacked repeatedly by the Arabs. The total area of the settlement including the island of Perim, is 80 sq. miles. Pop. (including Perim), 43,974.

Adenanthra (ad-en-an'the-ra), a genus of trees and shrubs, natives of the East Indies and

Ceylon, nat. order Leguminosae. *A. parvonia* is one of the largest and handsomest trees of India, and yields hard, solid timber called red sandalwood. The bright-scarlet seeds, from their equality in weight (each = 4 grains), are used by goldsmiths in the East as weights.

Adenitis (ad-en-itis; Gr. *aden*, a gland), in medicine, inflammation of the lymphatic glands.

Adenoids (ad'i-noidz) is a term applied to enlargements of the so-called pharyngeal, or Luschka's tonsil, which, however, is not, strictly speaking, a tonsil, but rather a collection of small lymph glands in the upper part of the posterior wall of the naso-pharynx. There are many of these small glands and when inflamed by any of the causes mentioned below they enlarge rapidly. Adenoids always exist when the tonsils are enlarged. By pressing on the nasal orifice of the eustachian tube, a musculo-membranous canal of small lumen connecting the middle part of the



Location of Infantile Adenoids.

a, Adenoids; b, nasal cavities; c, turbinated bones in nasal cavities.

ear with the nasal cavities, they cause a more or less chronic inflammation called eustachian catarrh, which may extend through the tube to the middle part of the ear, producing a stuffy feeling in the ear, of which the child usually complains that it 'hurts'; deafness; supuration or abscess or 'running ear,' and more or less permanent impairment of hearing. The adenoids interfere with the passage of air through the nose and naso-pharynx, being in some instances sufficiently large to entirely occlude the nasal passageway, compelling the child to breathe through his mouth, which makes

Adenoids

the mouth and larynx dry, and is one cause of cough. The enlargement of the tonsils, which accompanies it, produces constant cough in some children. The mouth breathing produces a characteristic facial expression, showing parted, thickened lips, prominent eyeballs, obliteration of the normal lines of expression, and a consequent appearance of listlessness and inferiority. Noisy respiration, snoring, diminished or absent vocal resonance; thickness of speech, with a nasal twang; absent-mindedness, apparent inattention (which may be due to mental dullness or impaired hearing or both, consequent upon the adenoids), inability to fix the attention, and defective memory are conditions presented by the child. These children are very backward in school, and the condition is frequently attributed to other than the real cause. The letters *m*, *n* and *ng* sometimes cannot be pronounced. The presence of the glands thus enlarged keeps up a continuous irritation in the mucous membrane in the nose and throat, leading to a chronic catarrh, with the persistent discharge of a thick, yellowish, mucopurulent secretion through the nose and downwards into the throat. This condition is almost impossible to cure while the adenoids remain, and is another cause of cough. If the condition has existed for some time, a narrow, pinched appearance of the nose results, and a narrowing of the upper jaw, together with a high arching of the roof of the mouth, thus reducing the breathing space within the nose. Bed-wetting is a frequent result of the condition. The tendency to the disease rapidly diminishes after the fifteenth year, and it is virtually absent from the adult. Adenoids are caused by repeatedly catching cold, long-continued cold in nose or throat, scarlet fever, measles, diphtheria and whooping cough. Heredity is a predisposing factor of variable consequence. The disease is becoming constantly more prevalent among children. The adenoid enlargement is always a condition concomitant with hypertrophied tonsils, both gland tissues being components of the general glandular system of the human body. The superficial position of these glands, being covered by mucous membrane only, subjects them to attacks of infectious bacteria, which so frequently gain entrance to the mouth. In fact, a great many varieties of bacteria can be found in the mouths of human beings at all times, ready to start up disease should a congestion occur, which would permit them to enter the tissues. It is in this manner that a cold starts up an infectious disease, of

Adirondack Mountains

which this and tonsillitis are examples. The *Micrococcus catarrhalis* is one of the known causes of inflammations that lead to hypertrophy of the pharyngeal and tonsillar glands. It is treated by surgical removal, which, when thoroughly done, usually prevents subsequent recurrence, though occasionally it may recur in slight form if some small glands remain after the excision. Bacterial vaccines, composed of from 30,000,000 to 100,000,000 killed bacteria of the same variety as had caused the disease, are now being used to cure the disease, and some success has resulted therefrom. Stuttering and stammering are sometimes cured by the removal of the adenoids and hypertrophied tonsils, together with the direct results above given, and the child promptly assumes his normal standing in his school studies.

Adernò (ä-der-nò') a town of Sicily, 18 miles N. W. of Catania and about 10 miles W. S. W. of Mount Ætna. Pop. 25,859.

Adersbach Rocks (ä-derz-bah, a remarkable group of isolated columnar rocks on the frontiers of Bohemia and Silesia, occupying several square miles of territory.

Adhesion (ad-hé'zhun), the tendency of two bodies to stick together when put in close contact, or the mutual attraction of their surfaces; distinguished from *cohesion*, which denotes the mutual attraction between the particles of a homogeneous body. Adhesion may exist between two solids, between a solid and a fluid, or between two fluids.

Adiantum, a genus of ferns; the maidenhair fern (*q. v.*).

Adige (ä-dé-jä), German ETSCH (ancient *Athēsis*), a river of Northern Italy, which rises in the Rætian Alps, and after a south and east course of about 180 miles, during which it passes Verona and Legnago, falls into the Adriatic, forming a delta connected with that of the Po.

Adipocere (ad'i-pō-sēr), (*L. adipos*, fat, and *cera* wax), a substance of a light-brown color formed by animal matter when protected from atmospheric air, and under certain circumstances of temperature and humidity.

Adipose Tissue, the cellular tissue containing the oily or fatty matter of the body. It underlies the skin, surrounds the large vessels and nerves, invests the kidneys, etc., and sometimes accumulates in large masses.

Adiron'dack Mountains, a large mountain group belonging to the Appalachian

chain extending from the N. E. corner of the State of New York to near its centre. The scenery is wild and grand, diversified by numerous beautiful lakes, and the whole region is a favorite resort of sportsmen and tourists. Mount Marcy (5344 ft.) is the highest peak. A State forest reserve, intended to protect the upper waters of the Hudson, occupies the greater part of the region.

Ad'it, a more or less horizontal opening giving access to the shaft of a mine. It is made to slope gradually from the farthest point in the interior to the mouth, and by means of it the principal drainage is usually carried on. See *Mine*.

Adjective (ad'jek-tiv), in grammar, a word used to denote some quality in the noun or substantive to which it is accessory. The adjective is indeclinable in English (but has *degrees* of comparison), and generally precedes the noun, while in most other European languages it follows the inflections of the substantive, and is more commonly placed after it, though in German it precedes it, as in English.

Adjudication (ad-jū-di-kā'shun) in general, the decision of a court of law; in bankruptcy proceedings, the final judgment.

Adjustment (ad-just'ment), in marine insurance, is the settling of the amount of the loss which the insurer is entitled under a particular policy to recover, and, if the policy is subscribed by more than one underwriter, of the amounts which the underwriters respectively are liable to pay.

Adjutant (ad-jū-tant), an officer appointed to each regiment or battalion, whose duty is to assist the commander. He is charged with instruction in drill, and all the interior discipline, duties, and efficiency of the corps. He has the charge of all documents and correspondence, and is the channel of communication for all orders.

Adjutant bird, *Leptoptilus argala*, a large grallatorial or wading bird of the stork family, native of the warmer parts of India, where it is known as Hurglia Argala. It stands about five feet high, has an enormous bill, nearly bare head and neck, and a pouch hanging from the under part of the neck. It is one of the most voracious carnivorous birds known, and in India, from its devouring all sorts of carrion and noxious animals, is protected by law. From underneath the wings are obtained those light, downy feathers known as *marabou* feathers, from the name of an allied species of bird (*L. marabou*) in-

habiting Western Africa, and also producing them.



Adjutant bird (*Leptoptilus argala*).

Adjutant-general, is the chief staff officer of an army charged with the execution of all orders relating to the recruitment, equipment, and efficiency of the troops, and who distributes to them the orders of the day. —Among the Jesuits this name was given to a select number of fathers, who resided with the general of the order, and had each a province or country assigned to him.

Ad'ler, Felix, ethical reformer; born of Jewish descent in Germany in 1851; graduated at Columbia College, New York. He was professor of oriental languages and literature at Cornell University 1874-76, when he organized in New York the Ethical Society, an organization of free religionists, which has spread to other cities. He is still a lecturer in this society; has published *Creed and Deed* and other works.

Ad Libitum (lib'i-tum), a musical term signifying that the part so marked may be played according to the taste of the performer and not necessary in strict written time; also that an instrument in instrumental scores may be either played or left out.

Admetus (ad-mē'tus), in Greek mythology, King of Phææ, in Thessaly, and husband of Alcestis, who gave signal proof of her attachment by consenting to die in order to prolong her husband's life. See *Alcestis*.

Administration (ad-min-is-trā'shun), in law, the management of the estate of intestate person, or of testator having no fit executor.

Administrator, in law, the person to whom the goods of

Admiral

a man dying intestate are committed by the proper authority, and who is bound to account when required.

Admiral (ad'mi-ral), the commander-in-chief of a squadron or fleet of ships of war, or of the entire naval force of a country, or simply a naval officer of the highest rank. In the British navy admirals are of four ranks—admiral of the fleet, admiral, vice-admiral, and rear-admiral.—The title *admiral of the fleet* is conferred on a few admirals, and carries an increase of pay along with it. A *vice-admiral* is next in rank and command to an admiral; he carries his flag at the foretopgallantmast head, while an admiral carries his at the main. A *rear-admiral*, next in rank to the vice-admiral, carries his flag at the mizzen-topgallantmast head.—*Lord high admiral*, in Great Britain, an officer who (when this rare dignity is conferred) is at the head of the naval administration of Great Britain. The rank of admiral was not known in the United States navy until 1862, when the office of rear-admiral was created and conferred first upon Farragut, for his services at New Orleans; vice-admiral was created for him in 1864, and admiral in 1866. The offices of admiral and vice-admiral were subsequently borne by David D. Porter, but discontinued after the death of the latter in 1891, until 1899, when the former was re-created for Dewey for his services in the harbor of Manila. In 1917 the U. S. navy list of flag officers included, besides the admiral of the navy, 21 active rear-admirals, three of whom were entitled to hold the rank of admiral while serving as commander-in-chief; one served as second in command, Atlantic fleet, and held the rank of vice-admiral while so serving; one held the rank of admiral while serving as chief of naval operations. There were 144 rear-admirals on the retired list.

Admiralty, that department of the government of a country that is at the head of its naval service. In Britain the lords commissioners of the admiralty were formerly seven, but are now five in number, with the addition of a civil lord, at the head being the *first lord*, and four others being *naval lords*.

Admiralty Court, a court which takes cognizance of civil and criminal causes of a maritime nature, including captures in war made, and offenses committed, on the high seas, and has to do with many matters connected with maritime affairs. In England the admiralty court was once held before the lord high admiral, and at a later period was presided over by his deputy or the deputy of the lords commissioners. In the United States admiralty cases are

Adonis

taken up in the first instance by the District Court, from which they may be removed in certain cases to the Circuit and ultimately to the Supreme Court.

Admiralty Island, an island belonging to the United States off the northwest coast of North America, 80 or 90 miles long and about 20 broad, covered with fine timber and inhabited by Sitka Indians.

Admiralty Islands, a cluster of islands, north of New Guinea, in Bismarck Archipelago, belonging to Germany previous to the European war. The largest is about 60 miles in length, the rest are much smaller. They are covered with a luxuriant vegetation and possess dense groves of coconut trees. The islanders are of a tawny color, have no metal except what is imported, but use tools of stone and shell.

Adnate (ad'nāt), in botany, applied to a part growing attached to another and principal part by its whole length, as stipules adnate to the leaf-stalk.

Adobe (ā-dō'bā), the Spanish name for a brick made of loamy earth, containing about two-thirds fine sand and one-third clayey dust, sun-dried; in common use for building in Mexico and Texas.

Adolescence (ad-ō-les'ens), the term now commonly adopted for the period between childhood and maturity, during which the characteristics—mental, physical and moral—that are to make or mar the individual are disclosed.

Adolphus of Nassau, was elected King of Germany, 1292. In 1298 the college of electors transferred the crown to Albert of Austria, but Adolphus refusing to abdicate a war ensued, in which he fell, after a heroic resistance, July 2, 1298.

Adonai (ad'o-nī), a name of God among the Jews. See *Jehovah*.

Adoni (ā-dō'nē), a town of Madras presidency, British India, population 30,416. Well known for excellent silk and cotton fabrics.

Adonis (a-dō'nīs), a mythological personage, originally a deity of the Phœnicians, but borrowed into Greek mythology. He was represented as being a great favorite of Aphroditē (Venus), who accompanied him when engaged in hunting, of which he was very fond. He received a mortal wound from the tusk of a wild boar, and when the goddess hurried to his assistance she found him lifeless, whereupon she caused his blood to give rise to the anemone. The worship



of Adonis, which arose in Phœnicia, latterly was widely spread round the Mediterranean. The name Adonis is akin to the Hebrew *Adonai*, Lord. See *Jehovah*.

Adonis, the modern Nahr-Ibrahim, a small river in Syria, rising in the Lebanon and flowing to the Mediterranean. It is connected with the legend of Adonis.

Adonis, a genus of ranunculaceous plants. In the corn-adonis or pheasant's eye (*A. autumnalis*) the petals are bright scarlet like the blood of Adonis, from which the plant is fabled to have sprung.

Adoptiani (a-dop-shi-a'ni), a religious sect which asserted that Christ, as to his divine nature, was properly the Son of God; but as to his human nature, only such by adoption. Elipandus, archbishop of Toledo, and Felix, bishop of Urgel, in Spain, avowed this doctrine in 783, and made proselytes both in Spain and France. The heresy was condemned by several synods.

Adoption (a-dop'shun), the admission of a stranger by birth to the privileges of a child. Among the ancient Greeks and Romans, and also some modern nations, adoption is placed under legal regulation. In Rome the effect of adoption was to create the legal relation of father and son, just as if the person adopted were born of the blood of the adopter in lawful marriage. The adopted son took the name of his adopter, and was bound to perform his new father's religious duties.

Adour (â-dör), a river of France, rising in the Pyrenees, and falling into the sea a little below Bayonne; length about 200 miles.

Adra (â-drâ), a seaport of Southern Spain, in Andalusia, near the mouth of the Adra, on the Mediterranean; with marble quarries and lead works. Pop. 11,188.

Adramyti (â-drâ-më'të) (ancient *Adramyttium*; the Turkish *Edremid*), a town of Turkey in Asia, near the head of the gulf of the same name, 80 miles north of Smyrna. Pop. about 5000.

Adrar, or Aderar (â-dë-rar'), a district in the Western Sahara peopled by Berbers possessing camels, sheep and oxen, and cultivating dates, wheat, barley and melons. Chief towns, Wadan and Shinghit. It has inexhaustible beds of rock-salt.

Adrenal (ad-rë'nal), the term applied in anatomy to a pair of small glandular or follicular but ductless bodies, of unknown function, capping the kidneys in mammals and most other ver-

tebrates. They are also called suprarenal or atrabiliary capsules.

Adrenalin (ad-ren'a-lin), the active principle of the adrenal glands, first isolated by a Japanese chemist, Takamine. Its probable formula is $C_{10}H_{15}NO_{1/2}H_2O$. It increases blood pressure and constricts the vessels, and is employed to arrest hemorrhage, etc.

Adria (â'dri-ä), a cathedral city of Northern Italy, province of Rovigo, between the Po and the Adige, on the site of the ancient town of same name, whence the Adriatic derived its appellation. Owing to alluvial deposits the sea is now 17 miles distant. Pop. 15,678.

Adrian (â'dri-an), the name of six popes. The first, a Roman, ruled from 772-795; a contemporary and friend of Charlemagne. He expended large sums in rebuilding the walls and restoring the aqueducts of Rome.—**ADRIAN II**, a Roman, was elected pope in 867, at the age of seventy-five years. He died in 872, in the midst of conflicts with the Greek Church.—**ADRIAN III**, a Roman, elected 884, was pope for one year and four months only. He was the first pope that changed his name on the occasion of his exaltation.—**ADRIAN IV**, originally named Nicolas Breakspear, the only Englishman that ever occupied the papal chair, was born about 1100, and died 1159. He was a native of Hertfordshire, studied in France, and became abbot of St. Rufus in Provence, cardinal and legate to Norway. Chosen pope in 1154, his reign is chiefly remarkable for his almost constant struggle for supremacy with Frederick Barbarossa, who on one occasion had been forced to hold his stirrup, and had been crowned by him at Rome (1155). He issued the famous bull (1158) granting the sovereignty of Ireland, on condition of the payment of Peter's pence, to Henry II.—**ADRIAN VI**, previously called *Ottoboni da Fiesco*, of Genoa, settled, as legate of the pope, the dispute between King Henry III of England and his nobles in favor of the former, but died a month after his election to the papal chair (1276).—**ADRIAN VI**, born at Utrecht in 1459, was elected to the papal chair, January 9, 1522. He tried to reform abuses in the church, to restrain the zeal of Luther with reproaches and threats, and even attempted to excite Erasmus and Zuinglius against him. Died, 1523, after a reign of one year and a half.

A'drian, capital of Lenawee Co., Michigan, 73 miles w. s. w. of Detroit. It has abundant water power and large industries, including wire fence

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works, electrical supply factory, piano and organ factory, etc. There is an extensive shipping trade in grain, fruits, etc. Here are Adrian College and the State Industrial School for Girls. Pop. 10,763.

A'd ian, **PUBLIUS ÆLIUS HADRIANUS**. See *Hadrian*.

Adrianople (ad-ri-an-ō'pl) (Turkish *Edreneh*), an important city in that part of European Turkey which was ceded to the Balkan allies by the Treaty of London (1913). It is about 135 miles W. N. W. from Constantinople, on the Maritza (ancient *Hebrus*), at its junction with the Tundja and the Arda. It has a great mosque, among the most magnificent in the world; a palace, now in a state of decay; a grand aqueduct, and a splendid bazaar, manufactures of silk, woolen and cotton stuffs, otto of roses, leather, etc., and an important trade. Adrianople received its present name from the Roman emperor Adrian (*Hadrian*). In 1361 it was taken by Amurath I, and was the residence of the Turkish sovereigns till the conquest of Constantinople in 1453. In 1829 it was taken by the Russians, and here was then concluded the peace of Adrianople by which Russia received important accessions of territory in the Caucasus and on the coast of the Black Sea. The Russians occupied it also in 1878. In 1912-13, with a garrison of 50,000 men under Shukri Pasha, Adrianople sustained for five months a siege by the Bulgarians and Servians, but finally surrendered, March 16, 1913. It was subsequently recaptured by the Turks, and by agreement retained by them. Pop. (1912) 83,000. See *Balkan War*.

Adrian's Wall. See *Roman Walls*.

Adriatic Sea (ad-ri-at'ik), or **GULF OF VENICE**, an arm of the Mediterranean, stretching in a north-westerly direction from the Straits of Otranto, between Italy and the Balkan and Austrian dominions. Length, about 480 miles; average breadth, about 100; area, about 60,000 square miles. The rivers which it receives, particularly the Po, its principal feeder, have produced, and are still producing, great geological changes in its basin by their alluvial deposits. Hence *Adria*, between the Po and the Adige, which gives the sea its name, though once a flourishing seaport, is now 17 miles inland. The principal trading ports on the Italian side are Brindisi, Bari, Ancona, Sinigaglia and Venice; on the east side Ragusa, Fiume, Pirano, Pola and Trieste.

Adsorption (ad-sorp'shun), a specialized form of the word

absorption, applied to the condensation of a gas or vapor on the surface of a solid. This condensing power of solids was first discovered from the difficulty of maintaining a high vacuum, it appearing that a film of air was condensed upon the surface of the glass and was gradually given off into the vacuum. By heating the vessel while making the exhaustion this difficulty was largely overcome. Adsorption is ascribed to molecular attraction and adhesion of the gas. From this cause a solid body appears to weigh less when recently heated than when allowed to stand long in ordinary temperature.

Adularia (ad-ū-lā'ria), a very pure, limpid, translucent variety of felspar, called by lapidaries *moonstone*, on account of the play of light exhibited by the arrangement of its crystalline structure. Found on the Alps, but the best specimens are from Ceylon. So called from *Adula*, one of the peaks of St. Gothard, where specimens are got.

Adullam, CAVE OF, a cave to which David fled when persecuted by Saul, and whither he was followed by 'every one who was in distress, in debt, or discontented' (I Sam., xxii: 1, 2). The name *Adullamites* was given to an English political party, consisting of Mr. R. Lowe, Lord Elcho, and other Liberals, who opposed the majority of their party on the Franchise Bill of 1866. The term originated from a speech of Mr. John Bright, who likened the opposing members to those discontented persons that took refuge with David in the cave.

Adulteration (a-dul-tér-ā'shun), a term applied not only in its proper sense to the fraudulent mixture of articles of commerce, food, drink, drugs, seeds, etc., with noxious or inferior ingredients, but also by magistrates and analysts to accidental impurity, and even in some cases to actual substitution. The chief objects of adulteration are to increase the weight or volume of the article, to give a color which either makes a good article more pleasing to the eye or else disguises an inferior one, to substitute a cheaper form of the article, one from which the strength has been extracted, or one given a false strength.—Many adulterations are practised for the purpose of fraudulently increasing the weight or volume of an article. Bread is adulterated with alum or sulphate of copper, which gives solidity to the gluten of damaged or inferior flour; with chalk or carbonate of soda to correct the acidity of such flour; and with boiled rice or potatoes, which enables the bread to carry more water, and thus to produce a larger

number of loaves from a given quantity of flour. Wheat flour is adulterated with other inferior flours. Milk is usually adulterated with water. The adulterations generally present in butter consist of an undue proportion of salt and water, lard, tallow, and other fats. Genuine butter should not contain less than 80 per cent. of butter-fat. Tea is adulterated (chiefly in China) with sand, iron-filings, chalk, gypsum, China clay, exhausted tea leaves, and the leaves of the sycamore, horse-chestnut, and plum. Coffee is mingled with chicory, roasted wheat, roasted beans, acorns, mangel-wurzel, rye-flour, and colored with burned sugar and other materials. Cocoa and chocolate are mixed with the cheaper kinds of arrow-root, animal matter, corn, sago, tapioca, etc. Confections are adulterated with flour and sulphate of lime. Preserved vegetables are kept green and poisoned by salts of copper. The acidity of mustard is commonly reduced by flour, and the color of the compound is improved by turmeric. Pepper is adulterated with linseed-meal, flour, mustard husks, etc. Color is given to pickles by salts of copper, acetate of copper, etc. The adulteration of liquors and wines is very commonly practised, a great variety of substances being used for this purpose, inferior wines being in this way often substituted for high-priced ones. Medicines, such as jalap, opium, rhubarb, cinchona bark, scammony, aloes, sarsaparilla, squills, etc., are mixed with various foreign substances; castor-oil adulterated with other oils; and inferior oils mixed with cod-liver oil.—The adulteration of seeds is also largely practised. Acts against adulteration have been passed in various countries and at various times, laws of this kind in Britain going back as far as 1267. The most recent and one of the most far-reaching of these laws is the Pure Food Act, passed by the United States Congress in 1906 and taking effect January 1, 1907. This requires that all articles of food or medicine offered for sale shall be labeled so as to show their exact contents, under penalty of fine and imprisonment.

Adultery (a-dul'tér-i), the voluntary sexual intercourse of a married person with any other than the offender's husband or wife. When committed between two married persons, the offense is called double, and when between a married and single person, single adultery. The Mosaic, Greek, and early Roman law recognized the offense only when a married woman was the offender. By the Jewish law it was punished with death. In Greece the laws against it

were severe. By the laws of Draco and Solon adulterers, when caught in the act, were at the mercy of the injured party. In early Rome the punishment was left to the discretion of the husband and parents of the adulteress. The punishment assigned by the Lex Julia, under Augustus, was banishment or a heavy fine. Under Constantius and Constantine, adulterers were burned or sewed in sacks and thrown into the sea; under Justinian the wife was to be scourged, lose her dower, and be shut up in a monastery; at the expiration of two years the husband might take her again; if he refused she was shaven and made a nun for life. By the ancient laws of France this crime was punishable by death. In Spain personal mutilation was frequently the punishment adopted. In several European countries adultery is regarded as a criminal offense, but in none does the punishment exceed imprisonment for a short period, accompanied by a fine. In England formerly it was punishable with fine and imprisonment, and in Scotland it was frequently made a capital offense. In Great Britain at the present day, however, it is punishable only by ecclesiastical censure. In the United States the punishment of adultery has varied materially at different times. It is, however, very seldom punished criminally in the States.

Ad valo'rem (Lat., according to the value), a term applied to customs or duties levied according to the worth of the goods, as sworn to by the owner, and not according to number, weight, measure, etc.

Advance note, a draft on the owner of a vessel, generally for one month's wages, given by the master to the sailors on their signing the articles of agreement.

Advancement of Science. See American and British Associations.

Ad'vent (Latin *adventus*, an arrival, the coming of our Saviour'), the name applied to the holy season which occupies the four or, according to the Greek Church, six weeks preceding Christmas, and which forms the first portion of the ecclesiastical year, as observed by the Anglican, the R. Catholic and the Greek Church.

Adventists (ad'ven-tists), a small religious sect of the United States, who believe in the speedy coming of Christ, and generally practise adult immersion.—A more numerous sect is that called *Seventh-day Adventists*, who hold that the coming of Christ is at hand and maintain that the Sabbath is still th-

Adverb

seventh day of the week. See *Seventh-Day Adventists*.

Ad'verb, one of the parts of speech used to limit or qualify the signification of an adjective, verb, or other adverb; as, *very cold, naturally brave, much more clearly, readily agreed*. Adverbs may be classified as follows:—1, adverbs of time, as *now, then, never, etc.*; 2, of place, as *here, there, where, etc.*; 3, of degree, as *very, much, nearly, almost, etc.*; 4, of affirmation, negation, or doubt, as *yes, no, certainly, perhaps, etc.*; 5, of manner, as *well, badly, clearly, etc.*

Advertisement (ad-vér'tiz-ment), a notice given to individuals or the public of some fact, the announcement of which may affect either the interest of the advertiser or that of the parties addressed. The vehicle employed is generally special bills or placards and notices inserted in newspapers and periodicals, and the profit derivable from advertisements forms the main support of the newspaper press. Advertising has grown to a surprising extent, and is still growing, not only in the newspapers, but in boats, railway cars, and public buildings, on fences, rocks, and trees. The city papers are now of eight, twelve, sometimes twenty-four or more pages, of which more than half the space is occupied by advertisements. The extent and seeming extravagance of American advertising is astonishing to Europeans.

Advocate (ad'vō-kāt) (L. *advocatus*—*ad*, to, *roco*, to call), a lawyer authorized to plead the cause of his clients before a court of law. It is only in Scotland that this word seems to denote a distinct class belonging to the legal profession, the advocates of Scotland being the pleaders before the supreme courts.—The *Lord Advocate*, called also the *King's* or *Queen's Advocate*, is the principal law officer of the crown in Scotland. He is the public prosecutor of crimes in the Supreme Court, and senior counsel for the crown in civil causes. Being appointed by the crown, he goes out of office with the administration to which he belongs. As public prosecutor he is assisted by the solicitor-general and by four junior counsel called advocates-depute. In the United States and England an advocate is usually termed a counsel, counselor, or attorney-at-law.

Advocates' Library, the chief library in Scotland, located in Edinburgh, and founded about 1682 by the Faculty of Advocates, but long open to public use. In 1709 it obtained, along with eight other libraries,

Ægædean Islands

the right to a copy of every new book published in Britain, which right it still possesses. The number of volumes is over 500,000 and MSS. over 3000.

Advoca'tus Diab'oli (Devil's advocate), in the Roman Catholic Church, a functionary who, when a deceased person is proposed for canonization, brings forward and insists upon all the weak points of the character and life of the deceased, endeavoring to show that he is not worthy of sainthood. The opposite side is taken by the *Advocatus Dei*, God's advocate.

Advowson (ad-vou'zn), in English law, a right of presentation to a vacant benefice, or, in other words, a right of nominating a person to officiate in a vacant church. Those who have this right are styled *patrons*. Advowsons are of three kinds—*presentative, collative, and donative*: *presentative*, when the patron presents his clerk to the bishop of the diocese to be instituted; *collative*, when the bishop is the patron, and institutes or *collates* his clerk by a single act; *donative*, when a church is founded by the king, or any person licensed by him, without being subject to the ordinary, so that the patron confers the benefice on his clerk without presentation, institution, or induction.

Adytum (ad'i-tum), a secret place of retirement in the ancient temples, esteemed the most sacred spot; the innermost sanctuary or shrine. From this place the oracles were given, and none but the priests were permitted to enter it. The Holy of Holies or Sanctum Sanctorum of the Temple at Jerusalem was of this character.

Adze, a cutting instrument used for chipping the surface of timber, somewhat of a mattock shape, and having a blade of steel forming a portion of a cylindrical surface, with a cutting edge at right angles to the length of the handle.

Ædiles (ē'dilz), Roman magistrates who had the supervision of the national games and spectacles; of the public edifices, such as temples (the name comes from *ædes*, a temple); of private buildings, of the markets, cleansing and draining the city, etc.

Ædui (ē'du-i), one of the most powerful nations of Gaul, between the Liger (Loire) and the Arar (Saône). On the arrival of Julius Cæsar in Gaul (B.C. 58), they were subject to Ariovistus, but their independence was restored by Cæsar. Their chief town was Bibracte (Autun).

Ægædean Islands (ē-ga-dē'an), a group of small

islands lying off the western extremity of Sicily, and consisting of Maritimo, Favignana, Levanzo, and Le Bormice.

Ægagrus (ē-gag'rus), a wild species of ibex (*Capra ægagrus*), found in troops on the Caucasus and many Asiatic mountains, believed to be the original source of at least one variety of the domestic goat.

Ægean Sea (ē-jē'an), that part of the Mediterranean which washes the eastern shores of Greece, the southern coast of Turkey, and the western coast of Asia Minor. See *Archipelago*.

Ægilops (ē-jī-lōps), a genus of grasses, very closely allied to wheat, and somewhat remarkable from the alleged fact that by cultivation one of the species becomes a kind of wheat.

Ægina (ē-jī'na), a Greek island in the Gulf of Ægina, south of Athens, triangular in form; area about 32 square miles; pop. 7,000. Except in the west, where the surface is more level, the island is mountainous and unproductive. The inhabitants are chiefly engaged in trade, seafaring, and agriculture, the chief crops being almonds, olives, and grain. The greater number of them reside in the seaport town of Ægina. Ægina was anciently colonized by Dorians from the opposite coast of Peloponnesus. In the latter half of the sixth century B.C. it had a flourishing commerce, a large navy, and was the seat of a distinct school of art. At the battle of Salamis (480 B.C.) the Æginetans behaved with great valor. In 456 the island fell under the power of the Athenians, and in 431 the Æginetans were expelled to make room for Athenian settlers, but were afterwards restored. On a hill are the remains of a splendid temple of Athena (Minerva), many of the columns of which are still standing. Here were found in 1811 a number of marble statues (the *Æginetan marbles*), which are now at Munich, and are prized as throwing light on the early history of Greek art. Though in these figures there is a wonderfully exact imitation of nature, yet there is a certain stiffness about them and an unnatural sameness of expression in all. They should probably be assigned to the period 500-480 B.C.

Ægis (ē'jis), the shield of Zeus, according to Homer, but according to later writers and artists a metal cuirass or breastplate, in which was set the head of the Gorgon Medusa, and with which Athena (Minerva) is often figured as being protected. In a figurative sense the word is used to denote some shielding or protecting power.

Ægle (ē'glē), a genus of plants. See *Bel*.

Ægospotami (ē-gos-pot'a-mī), ('goat rivers') a place on the Hellespont, of some note in Greek history, the Athenian fleet being here completely defeated in 405 B.C. by the Spartan Lysander, thus ending the Peloponnesian war.

Ælfrie (al'frik), Abbot, called *Grammaticus* (the grammarian), was a celebrated English author of the eleventh century. He became a monk of Abingdon, was afterwards connected with Winchester, and died Abbot of Eynsham. His principal works are two books of homilies, a *Treatise on the Old and New Testaments*, a translation and abridgment of the first seven books of the Bible, *Latin Grammar and Glossary*, etc. He has been frequently confounded both with Ælfrie, Archbishop of Canterbury, and Ælfrie, Archbishop of York, who lived about the same time.

Ælianus (ē-lī-ā'nus), CLAUDIUS, or CAUDILIUS, a Roman author who lived about A.D. 220 and wrote in Greek a collection of stories and anecdotes and a natural history of animals.

Ælst (Ælst), a Belgian town, same as *Alost*.

Æneas (ē-nē'as), the hero of Virgil's *Æneid*, a Trojan, who, according to Homer, was, next to Hector, the bravest of the warriors of Troy. When that town was taken and set on fire, Æneas, according to the narrative of Virgil, with his father, son, and wife Creusa, fled, but the latter was lost in the confusion of the flight. Having collected a fleet he sailed for Italy, but after numerous adventures he was driven by tempest on the coast of Africa, where Queen Dido of Carthage received him kindly, and would have married him. Jupiter, however, sent Mercury to Æneas and commanded him to sail for Italy. While the deserted Dido ended her life on the funeral pile Æneas set sail with his companions, and after further adventures by land and sea reached the country of King Latinus, in Italy. The king's daughter Lavinia was destined by an oracle to a stranger, this stranger being Æneas, but was promised by her mother to Turnus, king of the Rutuli. This occasioned a war, after the termination of which, Turnus having fallen by his hand, Æneas married Lavinia. His son Ascanius, by Creusa his first wife, was the legendary ancestor of the kings of Alba Longa, and of Romulus and Remus, the founders of the city of Rome.

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Æolian Harp (æ-ō'li-an harp), a musical instrument generally consisting of a box of thin fibrous wood (often of deal), to which are attached from eight to fifteen fine cat-gut strings or wires, stretched on low bridges at each end, and tuned in unison. Its length is made to correspond with the size of the window or other aperture in which it is intended to be placed. When the wind blows athwart the strings it produces very beautiful sounds, sweetly mingling all the harmonic tones, and swelling or diminishing according to the strength or weakness of the blast. Its name is derived from Æolus (which see).

Æolians (æ-ō'li-ans) (Gr. Αἰολῆς), one of the four races into which the ancient Greeks were divided, originally inhabiting the district of Æolia, in Thessaly, from which they spread over other parts of Greece. In early times they were the most numerous and powerful of the Hellenic races, chiefly inhabiting Northern Greece and the western side of Peloponnesus, though latterly a portion of them went to Lesbos and Tenedos and the northwest shores of Asia Minor, where they possessed a number of cities. Their language, the Æolian dialect, was one of the three principal dialects of the Greek. It was cultivated for literary purposes chiefly at Lesbos, and was the dialect in which Alcæus and Sappho wrote.

Æol'ipile (L. *Æoli pila*, the ball of Æolus), a spherical vessel of metal, with a pipe of small aperture, through which the vapor of heated water in the ball passes out with considerable noise; or having two nozzles so placed that the steam rushing out causes it to revolve on the principle of Barker's mill. It was known to the ancient Greeks.

Æolus (æ-ō-lus), in Greek mythology, the god of the winds, which he kept confined in a cave in the Æolian islands, releasing them when he wished or was commanded by the superior gods.

Æon (æ-on), a Greek word signifying life, an age, and sometimes eternity, but used by the Gnostics to express spirits or powers that had emanated from the Supreme Mind before the beginning of time. They held both Christ and the Holy Spirit to be æons; but as they denied the divine origin of the books of Moses, they said that the spirit which had inspired him and the prophets was not that exalted æon whom God sent forth after the ascension of Christ, but an æon very much inferior, and removed at a great distance from the Supreme Being.

Epyornis (è-pi-or-nis), a genus of gigantic birds whose re-

mains have been found in Madagascar, where it is supposed to have lived perhaps not longer than 200 years ago. It had three toes, and is classed with the cursorial birds (ostrich, etc.). Its eggs measured 14 inches in length, being about six times the bulk of those of the ostrich.

Æqui (æ'qui), an ancient people of Italy, conspicuous in the early wars of Rome, inhabiting the mountain district between the upper valley of the Anio (Teverone) and Lake Fucinus, and probably akin to the Volscians. They were defeated by Cincinnatus in B. C. 458, and again by the dictator Posthumus Tubertus in B. C. 428, and were finally subdued about B. C. 304-302.

A'rated Bread, bread which receives its sponginess or porosity from carbonic acid supplied artificially, and not produced by leaven or yeast.

A'rated Waters, waters impregnated with carbonic acid gas, and forming effervescing beverages. Some mineral waters are naturally aerated, as Vichy, Apollinaris, Rosbach, etc.; others especially, such as are used for medicinal purposes, are frequently aerated to render them more palatable and exhilarating. Water simply aerated, or aerated and flavored with lemonade or fruit syrups, is largely used, especially in summer, as a refreshing beverage. There are numerous varieties of apparatus for manufacturing aerated waters. The quantity of gas with which the water is charged is usually equal to a pressure of 5 atmospheres.

Aerians (æ-er-i-ans), the followers of Aërius, who in the fourth century originated a small heretical sect, objecting to the established feast-days, the distinction between bishops and presbyters, prayers for the dead, etc.

Aeroboat, a speed motorboat capable of 50 miles an hour on water. To the hull are attached the aeroplane surfaces of a standard aeroplane, so that the boat can at any moment rise from the surface of the water and attain a speed of 65 miles or more an hour. It may further be equipped with wheels, so that it can rise from or return to the ground instead of the water. The boat hull construction lends itself to endless modifications and improvements, especially in the matters of size and weight.

Aerodrome (æ'er-ō-drōm), a building in which to keep aeroplanes or an enclosure for testing them.

Aerodynamics (æ'er-ō-di-nam'iks), a branch of physical science which treats of the properties and motions of elastic fluids (air, gases), and of the appliances by which these are ex-

emplified. This subject is often explained in connection with hydrodynamics.

Aerœ, or Arroe (âr'eu-e), an island of Denmark, in the Little Belt, 15 miles long by 5 broad, with 12,000 inhabitants. Though hilly, it is very fertile.

Aerolite (â'er-ô-lit), a meteoric stone, meteorite, or shooting-star. See *Meteoric Stones*.

Aeronautics (â'er-ô-nau'tiks), the art of sailing in or navigating the air. The first form in which the idea of aerial locomotion naturally suggested itself was that of providing men with wings by which they should be enabled to fly. This is now known to surpass the muscular power of man, and all actual efforts at flight have been by the aid of some kind of elevating apparatus.

Balloons. The navigation of the air by means of the balloon dates only from about the close of the eighteenth century. In 1766 Henry Cavendish showed that hydrogen gas was at least seven times lighter than ordinary air, and it at once occurred to Dr. Black of Edinburgh that a thin bag filled with this gas would rise in the air, but his experiments were for some reason unsuccessful. Some years afterwards Tiberius Cavallo found that a bladder was too heavy and paper too porous, but in 1782 he succeeded in elevating soap-bubbles by inflating them with hydrogen gas. In this and the following year two Frenchmen, the brothers Stephen and Joseph Montgolfier, acting on the observation of the suspension of clouds in the atmosphere and the ascent of smoke, were able to cause several bags to ascend by rarefying the air within them by means of a fire below. These experiments roused much attention at Paris; and soon after a balloon was constructed under the superintendence of Professor J. A. C. Charles, which being inflated with hydrogen gas rose over 3000 feet in two minutes, disappeared in the clouds, and fell after three-quarters of an hour about 15 miles from Paris. These Montgolfier and Charles balloons already represented the two distinct principles in respect to the source of elevating power, the one being inflated with common air rarefied by heat, requiring a fire to keep up the rarefaction, the other being filled with gas lighter at a common temperature than air, and thus rendered permanently buoyant. Both forms were used for a considerable time, but the greater safety and convenience of the gaseous inflation finally prevailed. After the use of coal-gas had been introduced it superseded hydrogen gas, as being much less expensive, though having a far less elevating

power. The first person who made an ascent was Pilâtre de Rozier, who ascended 50 feet at Paris in 1783 in one of Montgolfier's balloons. A short time afterwards M. Charles and M. Robert ascended in a balloon inflated with hydrogen gas, and traveled a distance of 27 miles from the Tuilleries; M. Charles by himself also ascended to a height of about 2 miles. Of the earlier balloonists we may mention Lunardi, who made an ascent in Great Britain in 1784; Blanchard, who, along with the American Dr. Jeffries, first crossed the Channel from Dover to Calais, in 1785; Garnerin, who made the first successful descent by a parachute in 1797; and Gay Lussac, who reached the height of 23,000 feet in 1804. In 1836 a balloon carrying Messrs. Green, Holland, and Mason traversed the 500 miles between London and Weilburg in Nassau in eighteen hours. In 1859 Mr. J. Wise, the chief of American aeronauts, accompanied by several others, rose from New York, and landed, after a flight of 1150 miles, in twenty hours. In Sept., 1862, the renowned aeronaut, Mr. Glaisher, accompanied by Mr. Coxwell, made an ascent from Wolverhampton, and reached the elevation of 37,000 feet, or 7 miles. According to the geographical institute at Pavia, Italy, the highest altitude reached by any balloon was achieved by the Italian aviator, Giacomo Piccolo, who rose to a height of 105,000 feet, slightly over 18 miles above sea level; and 104,082 feet above actual ground. At the height of 59,196 feet the temperature fell to minus 43 degrees and maintained that figure all the way up with only slight variation. Piccolo was compelled to utilize his oxygen inhalator after he reached the height of 2 miles.

The balloon was adapted to scientific investigation at an early date, Prof. Charles making barometer and thermometer readings in 1783. Dr. Jeffries made the first purely scientific ascent in 1784 and the first important observations were made by Gay Lussac and Biot in 1804. The records of Glaisher and Coxwell, from 1862 to 1866, were long regarded as standards until modified by Assman in Germany, who made several important ascents with Gross and Besson in 1887, reporting meteorological faults and atmospheric conditions. Little change has been made in balloons since that built by Prof. Charles in 1783 with the exceptions of the ripping panel invented by Wise, by means of which the top of the balloon can be torn out, allowing the gas to escape rapidly for quick descent, and the drag rope devised by Green to steady the flight. This consists of a long rope trail-

ing below the car. Its function is to reduce the waste of gas and ballast required to keep the balloon at a proper altitude. When a balloon sinks so low that a good deal of the rope rests on the ground, it is relieved of so much weight and therefore tends to rise; if, on the other hand, it rises so that most of the rope is lifted off the ground, it has to bear a greater weight and tends to sink. The usual type of balloon is a pear shaped or round bag of pliable cloth, preferably silk, which has been coated with rubber dissolved in varnish. The size of the bag varies from 20 to 30 feet in diameter and is of approximately equal height. The mouth or neck of the bag is just large enough to admit a man to make repairs. The outside of the balloon is covered by a closely fitted net of cord, the ends of which are fastened to a circular hoop placed a few feet below the neck. The car, generally a large wicker basket, is suspended some distance below the hoop by ropes attached to it. The net serves to distribute the weight of the car and its contents over the whole top of the balloon. An important feature of balloon construction is the valve, a wooden or metal clapper, from 1 to 3 feet in diameter, placed in the top of the bag. It opens inward and is ordinarily kept closed by springs. The rope by which this valve is opened hangs straight down through the neck of the balloon and is usually allowed to hang loose, to avoid any chance of accidental opening. The car itself is equipped with sandbags as ballast, thermometers, barometers, hygrometers, compasses, maps and a long rope with an anchor for stopping the balloon when it nears the ground, in addition to the drag rope before mentioned.

MILITARY BALLOONS. The adaptation of the balloon to military use promptly followed its discovery. Soon after the beginning of the French revolutionary war an aeronautical school was founded at Meudon and four military observation balloons constructed for the armies of the North, of the Sambre and Meuse, of the Rhine and Moselle, and of Egypt. In June, 1794, Colonel J. M. J. Coutelle ascended with the adjutant and general to reconnoitre the hostile army just before the battle of Fleurus and two reconnaissances were made of four hours each and it is generally stated that the information so gained was responsible for the French victory. The balloon corps was often used after this and the enemy was much disconcerted at having their movements so completely watched. From this time on the military observation balloon was used in most campaigns with more or

less success. In the American Civil war (1861) balloons were in considerable use by the Federal armies. There was a regular balloon corps attached to McClellan's army. During the siege of Paris (1870) balloons were very useful, providing the only means of communication with the outside world. Sixty-four were sent up. Ballooning as a recognized military science only dates back to about 1883 or 1884, when most of the great powers organized regular balloon establishments. A military observation balloon is captive and the cable which tethers it also carries telephone wires; the observer is thus able to keep in constant communication with his base.

In 1885 captive balloons were first used by the British army in the Sudan war. They were spherical—a shape which is still retained in some instances, though it has been supplanted to a large extent by the fantastic kite balloon. The British balloons are made of goldbeater's skin and range in capacity from 7000 to 10,000 cubic feet. The French balloon is larger, having a capacity of over 18,000 cubic feet; but smaller balloons are used as auxiliaries. The captive spherical balloon has done good service, but it is satisfactory only in calm weather. Endeavors to evolve a superior type of captive balloon which would have stability in spite of the wind, resulted in the Parseval-Siegsfeld observation balloon, known as the kite-balloon. It has the form of a cylinder with its axis horizontal. At one end there is an odd-looking surrounding outer bag, which is designed to prevent the balloon from spinning on its axis. The lower end of this outer bag is open, making it serve the purpose of a balloonet. The wind entering the balloonet steadies the main vessel somewhat in the manner of the tail of a kite. Hence the name applied to these captive balloons. All the belligerents in the Great war have made use of this type as an artillery 'spotter.'

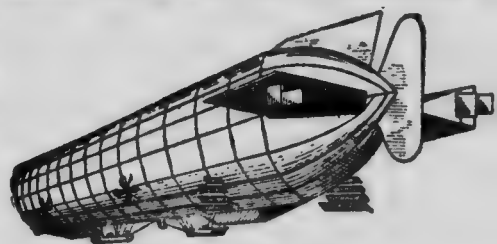
DIRIGIBLE BALLOONS. Very soon after the invention of balloons the problem of how to propel them against the wind arose. An elongated balloon propelled by oars was proposed by General J. B. M. C. Meunier and tried by the brothers Robert in 1874, who made four ascents. It was realized, however, that hand power was insufficient and experiments ceased until 1852, when Henri Gifford ascended with a very light steam engine for the period, it weighing only 154 pounds per horsepower, with fuel and water for one hour. He was not successful in stemming a moderate wind, however. In 1870 Dupuy de Lome was commissioned by the French government during the

siege of Paris to build a dirigible. He ascended with eight men to turn the screw propeller and succeeded in obtaining a deviation of 12° from a wind blowing 27 to 37 miles per hour. Tissandier and his brother had some success with a light electric motor in 1883 and 1884. The dirigible "La France" was built by Renard and Krebs, the officers in charge of the French War Aeronautical Department at Meudon in 1884 and 1885. The propeller was in front of the car and was driven by an electric motor. Seven ascents were made on calm days and the dirigible returned to its starting place in five of them. This apparatus attained a maximum speed of 14 miles per hour. In 1897, after years of experiment, a cigar-shaped balloon driven by a gasoline motor was completed by Dr. Wölfert in Berlin. An explosion took place in the air, however, and the inventor and his assistant were killed in the fall. In the same year an aluminum balloon was built from the designs of D. Schwarz in Berlin and equipped with a Daimler gasoline motor. It attained a greater speed than "La France," but met with an accident and was damaged beyond repair.

It was developed by these early experiments that a light and powerful source of motive power was needed for the successful realization of the hopes of the inventors. This need was supplied by the internal combustion engine, which from 1900 on began to be developed in hitherto unheard of lightness of weight in relation to power. Other questions arose, however. In order to drive the gas bag economically and efficiently through the air it must be kept inflated. Two systems have been used to effect this. In one, the envelope is kept in the proper shape entirely by inflation, which is accomplished by inflating with air small bags or balloons contained in the gas bag. This type has been perfected in the German Parseval airship. The other system is that developed by Count Zeppelin, of a rigid framework covered with fabric, the gas being stored in separate drum-shaped compartments inside the frame. A third system, using both principles, is found in the French semi-rigid type, in which a collapsible envelope with internal balloons, is stiffened by a rigid keel extending beneath the envelope from which the car is suspended.

GERMAN DIRIGIBLES. From 1897 on, experiments were conducted by Count Ferdinand von Zeppelin of the German Army on an immense airship to carry five men. It consisted of a rigid cylindrical aluminum framework with pointed

ends, containing sixteen gas bags with a total capacity of nearly 400,000 cubic feet. Two cars were suspended from the framework, each containing a 16 horsepower motor. On its first test in June, 1900, it



Zeppelin's Dirigible.

made a speed of 18 miles per hour and traveled 3½ miles before an accident to the steering gear forced it to descend. A second airship, whose two motors developed 85 horsepower, was built in 1905, but was wrecked in a storm. A third ship, built in 1906, traveled around Lake Constance and reached a speed of 36 miles per hour, remained in the air for several hours, carrying a number of passengers. A fourth airship, of similar design but more powerful motors, in 1908 succeeded in traveling 250 miles in 11 hours, but was wrecked when on land and burned at Echterdingen. Subscriptions were at once raised to help Zeppelin build another, and from this beginning grew Germany's fleet of monster airships which were used in bombing raids and for purposes of observation in the European war (q. v.). Other dirigibles were the Parseval, developed by Major von Parseval of the Bavarian army, whose airship was of a collapsible type without a rigid frame, which could be readily transported by an army and inflated in the field from cylinders of compressed gas or generators; the Gross airships, designed by Major von Gross of the German army, of a semi-rigid type; the Schütte-Lanz, a rigid airship with wooden frame and large gas capacity; the Suchard, built for long distance travel, but not used for the ocean flights for which it was designed.

The Zeppelin was considered the supreme war dirigible, but with the increasing defensive ability of the anti-aircraft guns and the armored aeroplanes the destructive power of the big rigid airships has been greatly reduced. Many Zeppelin raids on London and other towns in England were undertaken during the European war, at first with success but later with disastrous results to the huge airships, some of which containing from 750,000 to 2,000,000 cubic feet of gas, and costing

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TRANSATLANTIC FLIERS

Top: American Navy Seaplane NC-4 which crossed the ocean with one stop at the Azores, reaching Portugal, May 27, 1919. Center: The British Vickers-Vimy bombing plane, which made the first non-stop flight across the Atlantic, June 16, 1919. Bottom: The British Dirigible R-34 which flew across the Atlantic, July 6, 1919.

from \$1,000,000 to \$2,500,000, were captured by the British forces. Toward the end of 1917 the Zeppelin had been discarded for the heavier-than-air machines, and squadrons of bomb-carrying aeroplanes took up the work of raiding. The multiple-gas bag system of the Zeppelin protects the huge airship to some extent, for two or three of these gas compartments may collapse without bringing the Zeppelin to earth; but gunners use incendiary shells which set aflame the balloon. For scouting purposes the Zeppelin proved its worth, not only on land but on sea. It was used for observation in the naval battle off Jutland Bank in May, 1916, and also in August of the same year when



Santos Dumont's Airship, rounding the Eiffel Tower.

the German *U-boat* fleet steamed toward England.

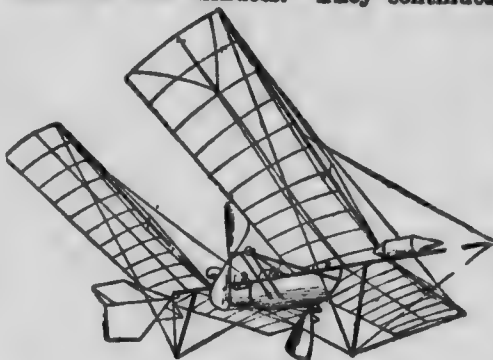
FRENCH DIRIGIBLES. During the same period experiments with dirigibles were conducted in Paris by Alberto Santos Dumont, who won the prize of 100,000 francs offered by Henri Deutsch de la Meurthe, in October, 1901, by traveling around the Eiffel Tower and back to his starting place in half an hour. Other successful airships of this period were those of Pierre and Paul Lebaudy, which made a speed of 25 miles per hour with several

passengers in the vicinity of Paris in 1903, using a 40-horsepower motor driving a steel propeller at 1000 revolutions per minute; the 'Lebaudy,' built by them in 1904; a new Lebaudy in 1905, which proved very successful in army use; 'La Patrie,' built by Lebaudy brothers in 1906, which was successful until carried away by a storm and destroyed in 1907; 'La Republique,' built on similar lines to the Lebaudy airships, which was destroyed by the breaking of one of the propeller blades; the semi-rigid 'Ville de Paris,' 'Clement-Bayard,' and 'France,' and in 1912 the rigid wooden-framed 'Spiess,' with a gas capacity of 371,000 cubic feet. By 1913 a considerable fleet of capable airships had been put in commission, chiefly of the non-rigid type, of about 318,000 cubic feet capacity and 34 miles per hour speed.

AMERICAN DIRIGIBLES. Comparatively little progress had been made in the United States in airship building up to the American entry into the European war. A moderate size dirigible was designed and constructed by Capt. Thomas S. Baldwin in 1908 and accepted by the government for the Army Signal Corps. It had a capacity of 20,000 cubic feet and was driven by a 20-horsepower gasoline engine, developing a speed of about 20 miles per hour. Two airships were built by Melvin Vaniman. In one of these, named 'America,' Walter Wellman tried to cross the Atlantic in 1910. The engines failed, however, and the airship drifted 1008 miles in 71 hours. The crew were rescued after abandoning the airship. Vaniman designed a new dirigible, the *Akron*, and essayed the flight to Europe with a crew of four men in 1911. An explosion totally destroyed the airship, Vaniman and his crew perishing. A gallant attempt to accomplish the flight across the ocean was made by the United States Navy dirigible, C-5, but this came to disaster on the afternoon of May 15, 1919, when after a successful flight from Montauk, N. Y., to Halifax, N. S., the C-5 broke from its moorings, was blown out over the sea and destroyed. The first dirigible to fly over the Atlantic was the British rigid airship, R-34, on July 2-6, 1919. In May of the same year the U. S. Navy aeroplane NC-4 crossed to Europe with a stop at the Azores. (See *Aeroplane*.) The first non-stop flight from America to Europe was made by a British Vickers-Vimy plane, June 14-15, 1919.

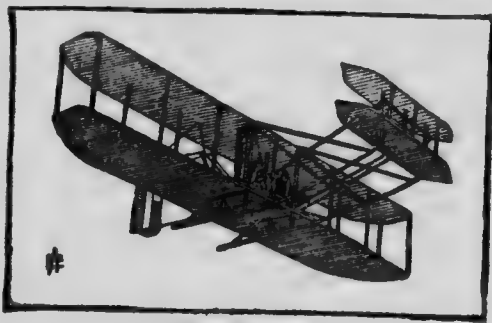
Aeroplane (*ä'er-ö-plän*), a flying machine heavier than air, and sustained by aid of propulsion from a source of power and the lifting action of the air on moving planes. Interesting ex-

periments in this field of flight were made by Otto Lilienthal, Hiram S. Maxim, and Prof. S. Langley near the close of the nineteenth century. These led to the conception of the aeroplane, or gliding machine, efforts to develop which were first begun in 1900 by two Americans, Orville and Wilbur Wright, of Dayton, O., whose experiments were made on a desolate sandy plain at Kitty Hawk, N. C. The first actual flight was made in September, 1902, when their crude machine kept afloat for two minutes. They continued



Langley's Aeroplane.

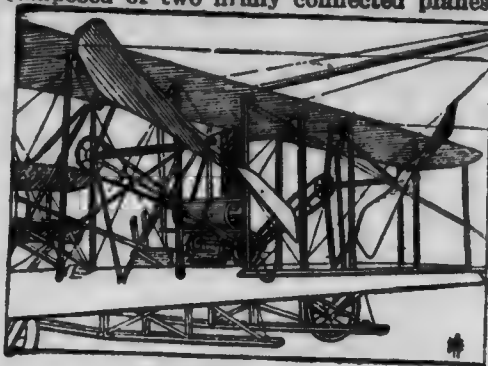
their experiments in secret for several years, 1908 being the first year of public aviation. Flights of considerable duration had been made, and on Sept. 10, 1908, Orville Wright remained in the air 62 minutes, 15 seconds, at Fort Meyer, near



Wright Biplane.

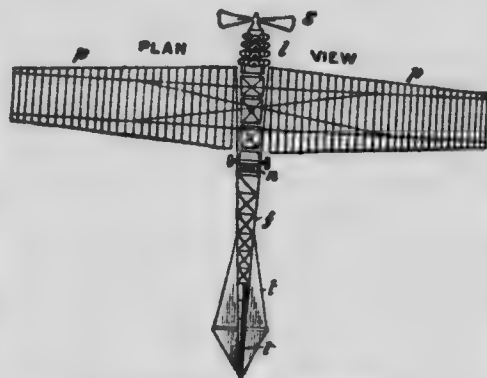
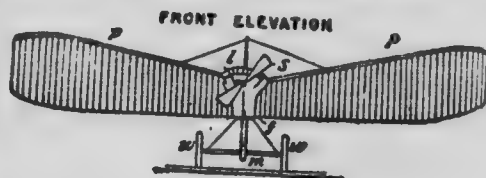
Washington. By this time many others were experimenting, especially in France, the first notable achievement that followed being the crossing of the English Channel by Jean Bleriot, on July 25, 1909. Count de Lesseps paralleled this feat in May, 1910, and on June 2, Charles S. Rolls, a young Englishman, surpassed it, doubly crossing the Channel from Dover to Calais and return, the flight of 50 miles being made in 90 minutes. The records for long flight, up to this time, were those of Louis Paulhan, who flew from London to Manchester (117 miles)

and won a prize of \$50,000, and Glenn H. Curtiss, who, on May 26, 1910, flew from Albany to New York, a distance of 150 miles, at an average speed of 51 2/3 miles per hour. Machines of two types were used in these flights, the biplane composed of two firmly connected planes



Wright Biplane. (rear).

the type of the Wright machine, and the monoplane, or single gliding plane, used by Bleriot. On June 13, 1910, Charles K. Hamilton flew from New York to



Plans of Antoinette Monoplane.

Philadelphia, a distance of 88 miles, in 1 hour 51 minutes, and returned to New York. In the latter half of 1910 aeroplane flights were very numerous, alike in the United States and Europe, and

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records for duration, distance, number of passengers carried, and altitude are more remarkable every year. Record for duration without stopping, 16 hours, 28 minutes, 36 seconds, made by Poulet, April 24, 1914. Duration without stopping, with one passenger, 9 hours, 45 minutes, made by Laitch at Johannisthal, October 28, 1913. Distance covered in one day, with landings, 1339 miles made by Stoeffler, October 14, 1913. Distance covered in one day, with one passenger, 934 miles, made by Schlegel, October 22, 1913. Distance over water, 530 miles across the Mediterranean from St. Raphael to Bizerta by Garros, flying a monoplane with-

added, and bombardments from the air were of frequent occurrence in the European war.

The French were the first to see the military possibilities of the aeroplane and in 1912 appropriated \$5,000,000 to military aeronautics. Following the example of France, Germany appropriated \$3,000,000 for this new arm of the military establishment. For several years Germany had regarded the Zeppelin airships as the superior of the heavier-than-air type, but the success of the speedy French monoplanes and biplanes came as a shock to the Zeppelin builders and Germany entered with vigor upon the task of aero-

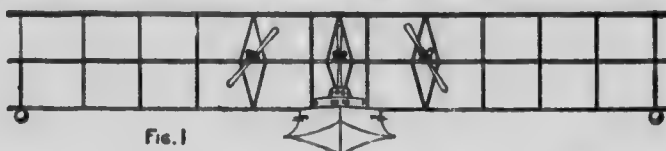


Fig. 1



Fig. 2



Fig. 3

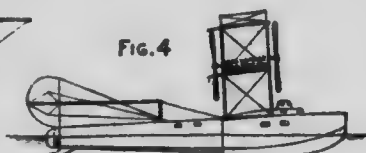


Fig. 4

Comparison of the Curtiss Triplane flying boat (Fig. 1) of 133-foot span, with the 'America' (Fig. 2) of 72-foot span, and the standard hydro-aeroplane (Fig. 3) of 35-foot span. Fig. 4 is a side view of the machine.

out boat or pontoons, September 22, 1913. Captain R. W. Schroeder, commanding officer of the testing squadron, at the Wright Field, at Fairfield, Ohio, flew to a height of 28,900 feet in September, 1918, exceeding all previous records.

The European war completely paralyzed competitive aviation, aeroplanes being commandeered for military purposes, and aviators pressed into army service. The demand of the countries at war, however, for larger, faster and more stable machines capable of carrying heavier weights of armament led to rapid development in the manufacture.

Military Aeroplanes. For military purposes the aeroplane has proved itself of incalculable benefit. So far as scouting is concerned, it has practically superseded cavalry. An aviator flying over the enemy lines may not only observe the movements of troops and take long-distance photographs of entrenchments, but in an artillery duel he can convey the range to the gunners, indicate targets, check and correct the fire, communicating with the base by means of signals or wireless telegraphy. Machine guns have been mounted on war planes for attack and defense in the air. Bomb chambers have been

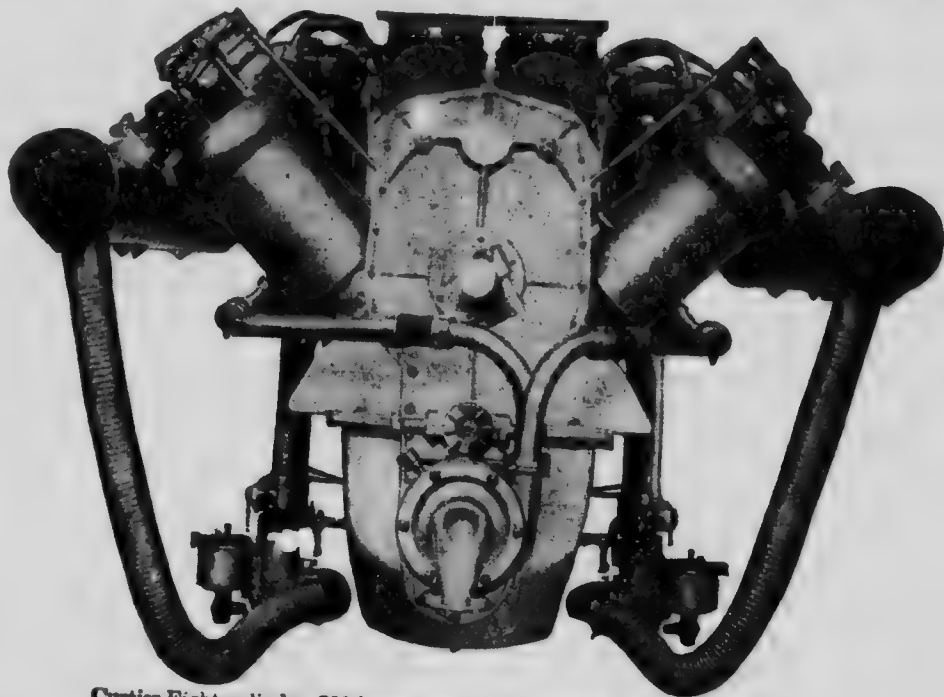
plane construction, increasing the appropriations to \$10,000,000 in 1913. Russia, Japan, Austria, Italy, and finally England and the United States, in the order named, prepared more or less elaborate aeroplane programs. The United States, after entering the European war, appropriated \$640,000,000 for aeroplane construction.

The biplane has been favored by America for military purposes, but both monoplanes and biplanes have done splendid service in war: the monoplane for general observation work; the armored biplane for offensive. Bomb-carrying biplanes in company with Zeppelins were used by Germany in attacks on Great Britain and France. The Allies countered with air raids on supply stores, bridges, aerodromes, and so forth, in territory occupied by the Teutonic forces. For bombing, aeroplanes have special chambers. Renaud's apparatus for discharging bombs has three tubes; the projectiles are dropped by the pressure of the operator's foot upon a pedal keyboard fixed in front of him. Some of the bombing planes carry as much as 1000 pounds of explosives. It is estimated that in 1916 the Allies carried out a total of 750 aerial bombardments. The French claimed

250 bombardments and estimated that the British had made 180 between Ypres and the Somme. The two allies also conducted most of the 174 bombardments in the Balkans.

It is difficult to ascertain the exact strength of the aerial armies at the beginning of the war in 1914, but from the most reliable estimates France seems to have had 1500 aeroplanes, Germany 1000 machines in the military establishment and 300 or 400 drawn from private

deck house; the French Dorand Voisin biplanes and the Nieuport monoplane; the British Bullet, which did some work in the early campaigns; and German 'Taube.' These types were soon followed by others, the British coming with a Handley-Page super-aeroplane with a Rolls-Royce engine of 250 h.p. Improved machines of the French were the Morane, the Scout, the remodeled Nieuport and the Spad—the latter name being derived from the initials of



Curtiss Eight-cylinder 200-horse-power Aeroplane Motor. View from rear.

owners after mobilization; Russia, 800 machines, of which 150 were contributed from private sources. And here it may be said that Russia was ready with dirigibles as well as aeroplanes, having 20 of these, for the most part small vessels, in the military service. Great Britain and Belgium had probably less than 200 aeroplanes between them. Including the Italian and Austrian nations and the smaller powers engaged in the war in 1914, it is estimated that there were in readiness in Europe an aggregate of 4980 aircraft of all descriptions for active service and reserve.

The types of aeroplanes in use when hostilities broke out were: the Russian biplane, 'Rusaki Wyas,' which carried a

sponsors—Société Pour les Appareils Deperdussin. The first Spads were fat little slug-like things, presenting scarcely any target, as they combined terrific speed with perfect ease of maneuvering. They were much used for attacking enemy dirigibles. Each pilot had eight incendiary rockets that could be loosened by pressing a button. At the opening of the Somme offensive the Spads were successfully employed against the enemy observation balloons.

Germany brought out the 200 h.p. Albatros, the 240 h.p. Halberstadt, the L.V.G., the Fokker, the Aviatik, the Roland, and a giant type of Gotha which developed great speed. The Italians constructed a number of Caproni biplanes; and the

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A triplane speed scout. Span of wings 25 feet. Speed 115 miles per hour.

British added a Sopwith biplane that achieved much fame. It may be mentioned here that it was in a Sopwith that Captain de Beauchamp and Lieutenant Dancourt bombed the Krupp works at Essen—compassing a radius of 500 miles with a cargo of bombs.

The German machine most familiar to the general public, at least for the first three years of the war, was the Taube, which was evolved by the Austrian engineer Igo Etrich in collaboration with Wels, his colleague. Their first practical machine was built in 1908, and some idea of the perfection of its design may be gathered from the fact that the Taube of 1916 and 1917 was substantially identical with the early model. The design of the machine follows very closely the lines of a bird in flight—hence its name, 'Taube,' or 'dove.' The likeness to a bird is emphasized in the ribs of the frame, which resemble a bird's feathers. The supporting plane is shaped in the manner of a bird's extended wing, and is tipped up at the rear ends to secure stability. The tail is also bird-like. It is extremely sensitive to its rudder, is very sharp in turning, and is a first-class craft for reconnoitering duty. The latest machines are fitted with motors developing 120 to 150 horse power. Other German machines which won fame in the military service are the Gotha and the Albatros. The former is a monoplane, with the Etrich bird-wing feature retained. The latter is a biplane, heavy and somewhat slow, but of great endurance.

At the beginning of the war the French possessed a great number and variety of aeroplanes. This aerial fleet was divided into squadrons, called 'esca-

drilles,' each of which comprised six machines and pilots. After a time the government frowned upon the employment of the Blériot, Deperdussin, Nieuport and R.E.P. monoplanes. Those receiving official sanction included the Maurice Farman, Voisin, Morane-Saulnier and one or two others. The Morane-Saulnier is a biplane of great speed and has been used for aggressive work. It is the French mosquito craft of the air. The Caudron, another machine approved by the French authorities, had the faculty of being able to climb at the rate of 330 feet per minute.

The backbone of the British aerial fleet was the Royal Aerial Factory, which not only engaged in the manufacture of machines and the development of aircraft for special duties, but also carried out the inspection and testing of machines built by private firms. Three types of machines were manufactured by the Royal Aerial: first, the scouting plane, built for speed; second, a tractor carrying a pilot and an observer, with a maximum speed of 40 to 50 miles an hour, fitted with an automatic gun; third, the essentially fighting machine, with the propeller at the rear, a Lewis gun fixed in front with the marksman immediately behind it—probably one of the safest of the battleplanes.

The Allied fighting planes were of two classes, one of which operated over the home lines in a defensive manner, while the other swept out over the enemy lines, protecting the home 'work' machines and giving battle to enemy pilots. These 'work' machines were made up of units of one or other of the following: scouting groups, artillery observation groups, aerial photography groups, bombing raid groups and infantry contact groups.

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Machine guns have been used by aviators not only against opponents in the air but against troops in the field. This has of course happened rarely, but there are instances where airmen, evading enemy aeroplanes and anti-aircraft guns, have swooped down within easy range of enemy troops and demoralized them by machine-gun fire. In the early days of the war, duels in the lower air were of frequent occurrence. Later, with improvements in construction, these duels in the lower air between two pilots became battles between squadrons of fast fighting machines, whirling against each other from 10,000 to 15,000 feet above the trenches, with their machine guns flashing. The newest type of light machine gun is a variation of the French 'Soixante-quinze,' and fires a projectile that can penetrate the defensive armor of any aeroplane at 1000 yards range.

The work of the reconnaissance aviator is difficult, for not only has he to contend with the enemy air fighters but if he flies too low he comes under fire of the anti-aircraft guns. Photographs, however, can be made from an altitude of 6000 feet with the aid of a phototopographic camera, an invention of Captain Scheimpflug of Vienna, which from that height gives a clear view of 32 square miles of country. Cameras fitted with telescopic lenses and motion-picture cameras are also employed by observers. The difficulty of communicating with the earth has been overcome by wireless telegraphy.

The use of wireless is attended with difficulty on aeroplanes, though it is successfully employed on Zeppelins and other dirigible balloons. Some aeroplanes have wireless aerials permanently fitted, but a

more satisfactory method, though one which has its disadvantages, is that of employing a trailing wire as an antenna. The fuselage and metallic parts forming the counterpoise. The noise of the motor makes it difficult to receive wireless messages, but an invention of Signor Marconi's is said to overcome this. The low-flying, directing airmen, known as 'contact patrols,' employed by the Allies in the Battle of the Somme, were supplied with Marconi's new wireless apparatus which enabled them to receive as well as transmit messages.

Seaplanes. With the success achieved by the aeroplane, inventors began to consider the possibility of combining the aircraft with the boat, for use on the sea. Hugo Matullath of New York seems to have been the first to suggest this, but beyond filing his specifications nothing was done to put his ideas into practical effect. The invention of the hydroseroplane is due to Glenn Curtiss who, in 1908, fixed floats to his aeroplane as safety devices, and Fabre, who added the floats as an integral part of the machine with the express idea of rising from the surface of the sea. Fabre gave a practical demonstration of his machine on the Seine in 1910. In the following year Curtiss brought out a biplane with floats instead of the usual long skids, and also added wheels for use on the land.

Transatlantic Flights. The honor of being the first to cross the Atlantic Ocean by the air route fell to the American tractor biplane, NC-4, which was equipped with four Liberty motors, each of 400 horse power. It had a wing span of 126 feet, a hull length of 50 feet, a gasoline capacity of 2000 gallons and an average



Curtiss twin-motor hydroseroplane. Two eight-cylinder motors of 100 horse-power each give this battleplane a speed of 85 miles per hour. It can be fitted with wheels and landing gear for field use.

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Aerostatic Press

speed of 80 miles an hour. Its commanding officer was Lieut.-Com. A. C. Read, U. S. N., and it was manned with five other officers of the U. S. Navy. The NC-4 and its sister planes, NC-1 and NC-3, flew from Rockaway Beach, N. Y., to Halifax, N. S., on May 7, 1919. On May 16 they started for the Azores. The NC-1 and NC-3 were so badly damaged when they reached the Azores that they were unable to continue the voyage. The NC-4 reached the harbor of Horta safely, and resumed its voyage on the morning of May 27, reaching Lisbon, Portugal, that night. The first non-stop flight was made June 14-15 by Captain John Alcock and Lieut. Arthur W. Brown in a British Vimy-Vickers plane in 16 hours and 12 minutes. The first dirigible to fly over the Atlantic was the British rigid airship R-34, on July 2-6, 1919. The return trip to England was made in 74 hours.

Aerostatic Press, a simple contrivance for rendering the pressure of the atmosphere available for extracting the coloring matter from dye-woods and similar purposes. A horizontal partition divides the machine into two parts. The lower part is connected with an air-pump, by means of which the air can be withdrawn from it. The matter from which the substance is to be extracted is laid upon the partition, which is perforated, and a perforated cover is placed over it and the air extracted from the lower vessel.

Aerostatics (ā-er-ō-stat'iks), that branch of physics which treats of the weight, pressure, and equilibrium of air and gases. See *Air*, *Air-pump*, *Barometer*, *Gas*, etc.

Aerotherapeutics (ā-er-ō-ther-a-pū'tiks), a mode of treating disease by varying the pressure or modifying the composition of the air surrounding the patient.

Æschines (es'ki-nēz), a celebrated Athenian orator, the rival and opponent of Demosthenes, was born 390 B. C. and died in 314. He headed the Macedonian party in Greece.

Æschylus (es'ki-lus), the first in time of the three great tragic poets of Greece, born at Eleusis, in Attica, B. C. 525, died in Sicily 456. Before he gained distinction as a dramatist he had highly distinguished himself at the battle of Marathon (490), as he afterwards did at Artemisium, Salamis, and Plataea. He first gained the prize for tragedy in B. C. 484. *The Persians*, the earliest of his extant pieces, formed part of a trilogy which gained the prize in B. C. 472. In B. C. 468 he was defeated by Sophocles, and then is said to have

gone to the court of Hiero, King of Syracuse. Altogether he is reputed to have composed seventy tragedies and gained thirteen triumphs. Only seven of his tragedies are extant: *The Persians*, *Seven against Thebes*, *Suppliants*, *Prometheus*, *Agamemnon*, *Choephoræ*, and *Eumenides*, the last three forming a trilogy on the story of Orestes, presented in B. C. 458. Æschylus may be called the creator of Greek tragedy, both from the splendor of his dramatic writings and from the scenic improvements and accessories he introduced. Till his time only one actor had appeared on the stage at a time, and by bringing on a second he was really the founder of dramatic dialogue. His style was grand, daring, and full of energy, though sometimes erring in excessive splendor of diction and imagery, if not indeed harsh or turgid. His plays have little or no plot, and his characters are drawn by a few powerful strokes. There are English poetical translations of his plays by Blackie, Plumptre, and Swanwick.

Æsculapius (es-kū-lā'pi-us), the god of medicine among the Greeks, subsequently adopted by the Romans, and usually said to have been a son of Apollo. He was worshiped in particular at Epidaurus, in Peloponnesus, where a temple with a grove was dedicated to him. The sick who visited his temple had to spend one or more nights in the sanctuary, after which the remedies to be used were revealed in a dream. Those who were cured offered a sacrifice to Æsculapius, commonly a cock. He is often represented with a large beard, holding a knotty staff, round which is entwined a serpent, the serpent being specially his symbol. Near him often stands a cock. Sometimes Æsculapius is represented under the image of a serpent only.

Æsculus (es'kū-lus), the genus of plants to which belongs the horse-chestnut.

Æsop (ē'sop), the Greek fabulist, is said to have been a contemporary of Cræsus and Solon, and thus probably lived about the middle of the sixth century B. C. But so little is known of his life that his existence has been called in question. He is said to have been originally a slave, and to have received his freedom from a Samian master, Iadmon. He then visited the court of Cræsus, and is also said to have visited Pisistratus at Athens. Finally he was sent by Cræsus to Delphi to distribute a sum of money to each of the citizens. For some reason he refused to distribute the money, whereupon the Delphians, enraged, threw him from a precipice, and killed him. No works of Æsop are extant, and it is

doubtful whether he wrote any. Bentley inclined to the supposition that his fables were delivered orally and perpetuated by repetition. Such fables are spoken of both by Aristophanes and Plato. Phædrus turned into Latin verse the Æsopian fables current in his day, with additions of his own. In modern times several collections purporting to be Æsop's fables have been published.

Æsthetics (es-thet'iks; pertaining to perception), the philosophy of the beautiful; the name given to the branch of philosophy or of science which is concerned with that class of emotions, or with those attributes, real or apparent, of objects generally comprehended under the term *beauty*, and other related expressions. The term *æsthetics* first received this application from Baumgarten (1714-1762), a German philosopher, who was the first modern writer to treat systematically on the subject, though the beautiful had received attention at the hands of philosophers from early times. Socrates, according to Xenophon, regarded the beautiful as coincident with the good, and both as resolvable into the useful. Plato, in accordance with his idealistic theory, held the existence of an absolute beauty, which is the ground of beauty in all things. He also asserted the intimate union of the good, the beautiful, and the true. Aristotle treated of the subject in much more detail than Plato, but chiefly from the scientific or critical point of view. In his treatises on poetry and rhetoric he lays down a theory of art, and establishes principles of beauty. His philosophical views were in many respects opposed to those of Plato. He does not admit an absolute conception of the beautiful; but he distinguishes beauty from the good, the useful, the fit, and the necessary. He resolves beauty into certain elements, as order, symmetry, definiteness. A distinction of beauty, according to him, is the absence of desire in the pleasure it excites. Baumgarten's treatment of *æsthetics* is essentially Platonic. He made the division of philosophy into logic, ethics, and *æsthetics*; the first dealing with knowledge, the second with action (will and desire), the third with beauty. He limits *æsthetics* to the conceptions derived from the senses, and makes them consist in confused or obscured conceptions, in contradistinction to logical knowledge, which consists in clear conceptions. Kant defines beauty in reference to his four categories, quantity, quality, relation, and modality. In accordance with the subjective character of his system he denies an absolute conception of

beauty, but his detailed treatment of the subject is inconsistent with the denial. Thus he attributes a beauty to single colors and tones, not on any plea of complexity, but on the ground of purity. He holds also that the highest meaning of beauty is to symbolize moral good, and arbitrarily attaches moral characters to the seven primary colors. The value of art is mediate, and the beauty of art inferior to that of nature. Other German philosophers have dealt with this subject, their speculations going far beyond the conceptions of English writers. Shaftesbury adopted the notion that beauty is perceived by a special internal sense; in which he was followed by Hutcheson, who held that beauty existed only in the perceiving mind, and not in the object. Numerous English writers, among whom the principal are Alison and Jeffrey, have supported the theory that the source of beauty is to be found in association—a theory analogous to that which places morality in sympathy. Dugald Stewart attempted to show that there is no common quality in the beautiful beyond that of producing a certain refined pleasure, and Bain agrees with this criticism, but endeavors to restrict the beautiful within a group of emotions chiefly excited by association or combination of simpler elementary feelings. Herbert Spencer has a theory of beauty which is subservient to the theory of evolution. He makes beauty consist in the play of the higher powers of perception and emotion, defined as an activity not directly subservient to any processes conducive to life, but being gratifications sought for themselves alone. He classifies æsthetic pleasures according to the complexity of the emotions excited, or the number of powers duly exercised; and he attributes the depth and apparent vagueness of musical emotions to associations with vocal tones built up during vast ages. Among numerous writers who have made valuable contributions to the scientific discussion of *æsthetics* may be mentioned Winckelmann, Lessing, Richter, the Schlegels, Gervinus, Helmholtz, and Ruskin.

Æstivation (es-ti-vā'shun), a botanical term applied to the arrangement of the parts of a flower in the flower-bud previous to the opening of the bud.—The term is also applied to the summer sleep of animals. See *Dormant State*.

Ætheling. See *Atheling*.

Æther. See *Ether*.

Æthio'pia. See *Ethiopia*.

Aethrioscope (eth'ri-s-cōp, Gr. *aithrios*, clear, cloudless), an instrument for measuring radiation towards a clear sky, consisting of a metallic cup with a highly-polished interior of paraboloid shape, in the focus of which is placed one bulb of a differential thermometer, the other being outside. The inside bulb at once begins to radiate heat when exposed to a clear sky, and the extent to which this takes place is shown by the scale of the thermometer. The aethrioscope also indicates the presence of invisible aqueous vapor in the atmosphere, radiation being less than when the air is dry.

Ethusa, a genus of umbelliferous plants. See *Fool's Parsley*.

Actius (a-she-us), a general of the western Roman Empire, born A.D. 396; murdered 454. As commander in the reign of Valentinian III he defended the empire against the Huns, Visigoths, Franks, Burgundians, etc., completely defeating the first in particular under Attila in a great battle at Châlons in 451. For twenty years he was at the head of public affairs, and latterly was murdered by Valentinian from jealousy of his power.

Æt'na. See *Etna*.

Ætolia (ē-tō'll-a), a western division of northern Greece, separated on the west by the Achelous from Acarnania and washed by the Corinthian Gulf on the south. The inhabitants are little heard of in Greek history till the Peloponnesian war, at which time they were notorious among the Greeks for the rudeness of their manners. Ætolia, in conjunction with Acarnania, now forms a nomarchy of the kingdom of Greece.

Affidavit (af-i-dā'vit), a written statement of facts upon oath or affirmation. Affidavits are generally made use of when evidence is to be laid before a judge or a court, while evidence brought before a jury is delivered orally. The person making the affidavit signs his name at the bottom of it, and swears that the statements contained in it are true. The affidavit may be sworn to in open court, or before a magistrate, notary public or other duly qualified person.

Affinity (a-fin'i-ti), in chemistry, the force by which unlike kinds of matter combine so intimately that the properties of the constituents are lost, and a compound with new properties is produced. Of the force itself we know little or nothing. It is not the same under all conditions, being very much modified by circumstances, especially

temperature. The usual effect of increase of temperature is to diminish affinity and ultimately to cause the separation of a compound into its constituents; and there is probably for every compound a temperature above which it would not exist, but would be broken up. Where two elements combine to form a compound heat is almost always evolved, and the amount evolved serves as a measure of the affinity. In order that chemical affinity may come into play it is necessary that the substances should be in contact, and usually one of them at least is a fluid or a gas. The results produced by chemical combination are endlessly varied. Color, taste, and smell are changed, destroyed, or created; harmless constituents produce strong poisons, strong poisons produce harmless compounds.

Affinity, in law, is that degree of connection which subsists between one of two married persons and the blood relations of the other. It is no real kindred (consanguinity). A person cannot, by legal succession, receive an inheritance from a relation by affinity; neither does it extend to the nearest relations of husband and wife so as to create a mutual relation between them. The degrees of affinity are computed in the same way as those of consanguinity or blood.

Affirmation (af-er-mā'shun), a solemn declaration by Quakers and others, who object to taking an oath, in confirmation of their testimony in courts of law, or of their statements on other occasions on which the sanction of an oath is required of other persons. In England the form for Quakers is, 'I do solemnly, sincerely, and truly declare and affirm.' Affirmation is generally allowed to be substituted for an oath in all cases where a person refuses to take an oath from conscientious motives, if the judge is satisfied that the motives are conscientious. False affirmation is subjected to the same penalties as perjury.

Afghanistan (af-gan-i-stān'), the land of the Afghans, a country in Asia bounded on the east by Kashmir and the Punjab, on the south by Beluchistan, on the west by the Persian province of Khorasan, and on the north by Bokhara and Russian Turkestan. In part the boundaries are not well defined, but recently that of the Oxus to the Persian frontier has been surveyed and marked by boundary stones by a joint Russian and British commission. The area may be set down at about 240,000 sq. miles. The population is estimated at about 5,000,000. Afghanistan consists chiefly of lofty, bare, uninhabited table-

lands, sandy barren plains, ranges of snow-covered mountains, offsets of the Hindu Kush or the Himalayas, and deep ravines and valleys. Many of the last are well watered and very fertile, but about four-fifths of the whole surface is rocky, mountainous, and unproductive. The surface on the northeast is covered with lofty ranges belonging to the Hindu Kush, whose heights are often 18,000 and sometimes reach perhaps 25,000 feet. The whole northeastern portion of the country has a general elevation of over 6,000 feet; but towards the southwest, in which direction the principal mountain chains of the interior run, the general elevation declines to not more than 1600 feet. In the interior the mountains sometimes reach the height of 15,000 ft. Great part of the frontier towards India consists of the Suleiman range, 12,000 feet high. There are numerous practicable avenues of communication between Afghanistan and India, among the most extensively used being the famous Khyber Pass, by which the river Cabul enters the Punjab; the Gomul Pass, also leading to the Punjab; and the Bolan Pass on the south, through which the route passes to Sind. Of the rivers the largest is the Helmund, which flows in a southwesterly direction more than 400 miles, till it enters the Hamoon or Seistan swamp. It receives the Arghandab, a considerable stream. Next in importance are the Cabul in the northeast, which drains to the Indus, and the Hari Rud in the northwest, which, like other Afghan streams, loses itself in the sand. The climate is extremely cold in the higher, and intensely hot in the lower regions, yet on the whole it is salubrious. The most common trees are pines, oaks, birch, and walnut. In the valleys fruits, in the greatest variety and abundance, grow wild. The principal crops are wheat, forming the staple food of the people; barley, rice, and maize. Other crops are tobacco, sugar-cane, and cotton. The chief domestic animals are the dromedary, the horse, ass, and mule, the ox, sheep with large fine fleeces and enormous fat tails, and goats; of wild animals there are the tiger, bear, leopard, wolf, jackal, nyena, fox, etc. The chief towns are Cabul (the capital), Kandahar, Ghuzni, and Herat. The inhabitants belong to different races, but the Afghans proper form the great mass of the people. They are allied in blood to the Persians, and are divided into a number of tribes, among which the Duranis and Ghiljis are the most important. The Afghans are bold, hardy, and warlike, fond of freedom and resolute in maintaining it, but of a rest-

less, turbulent temper, and much given to plunder. Tribal dissensions are constant in existence, and seldom or never do the Afghans pay allegiance to the nominal ruler of their country. Their language is distinct from the Persian, though it contains a great number of Persian words and is written, like the Persian, with the Arabic characters. In religion they are Mohammedans of the Sunnite sect.

The history of Afghanistan belongs almost to modern times. The collective name of the country itself is of modern and external origin (Persian). In 1735 the country was conquered by the Persians under Nadir Shah. On his death in 1747 Ahmed Shah, one of his generals, obtained the sovereignty of Afghanistan and became the founder of a dynasty which lasted about eighty years. At the end of that time Dost Mohammed, the ruler of Cabul, had acquired a preponderating influence in the country. On account of his dealings with the Russians the British resolved to dethrone him and restore Shah Shuja, a former ruler. In April, 1839, a British army under Sir John Keane entered Afghanistan, occupied Cabul, and placed Shah Shuja on the throne, a force of 8000 being left to support the new sovereign. Sir W. Macnaghten remained as envoy at Cabul with Sir Alexander Burnes as assistant envoy. The Afghans soon organized a wide-spread insurrection, which came to a head on Nov. 2, 1841, when Burnes and a number of British officers, besides women and children, were murdered, Macnaghten being murdered not long after. The other British leaders now made a treaty with the Afghans, at whose head was Akbar, son of Dost Mohammed, agreeing to withdraw the forces from the country, while the Afghans were to furnish them with provisions and escort them on their way. On 6th January, 1842, the British left Cabul and began their most disastrous retreat. The cold was intense, they had almost no food—for the treacherous Afghans did not fulfil their promises—and day after day they were assailed by bodies of the enemy. By the 13th, 26,000 persons, including camp-followers, women and children, were destroyed. Some were kept as prisoners, but only one man, Dr. Brydon, reached Jelalabad, which, as well as Kandahar, was still held by British troops. In a few months General Pollock, with a fresh army from India, retook Cabul and soon finished the war. Shah Shuja having been assassinated, Dost Mohammed again obtained the throne of Cabul, and acquired extensive power in Afghanistan. He joined with the Sikhs against the British, but after

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wards made an offensive and defensive alliance with the latter. He died in 1863, having nominated his son Shere Ali his successor. Shere Ali entered into friendly relations with the British, but in 1878, having repulsed a British envoy and refused to receive a British mission (a Russian mission being meantime at his court), war was declared against him, and the British troops entered Afghanistan. They met with comparatively little resistance; the ameer fled to Turkestan, where he soon after died; and his son Yakooab Khan having succeeded him concluded a treaty with the British (at Gandamak, May, 1879), in which a certain extension of the British frontier, the control by Britain of the foreign policy of Afghanistan, and the residence of a British envoy in Cabul, were the chief stipulations. The members of the mission were again treacherously attacked and slain, and troops were again sent into the country. Cabul was once more occupied, and Kandahar and Ghazni were also relieved; while Yakooab Khan was sent to imprisonment in India. In 1890 Abdur-Rahman, a grandson of D. Mohammed, was recognized by Britain as emir of the country, and continued on friendly terms with the British, by whom he was subsidized, until his death in 1901, his son Habibullah Khan succeeding. Encroachments by the Russians on territory claimed by Afghanistan almost brought about a rupture between Britain and Russia in 1885, and led to the delimitation of the frontier of Afghanistan on the side next the territory now occupied by Russia. An Anglo-Russian convention was made in 1907 in which Britain declared that she would not annex or occupy any part of Afghanistan and Russia recognized that country as outside her sphere of influence, agreeing to deal with it politically only through the channel of the British government.

Afium-Kara-Hissar ('opium-black-castle'), a city of Asiatic Turkey, 170 miles E. S. E. of Constantinople, with manufactures of woollens, and a trade in opium (*afium*), etc. Pop. 20,000.

Afragola (a-fra-gō'la), a town of Italy, about 6 miles N. N. E. of Naples, has extensive manufactures of straw bonnets. Pop. 22,000.

Afranius, Lucius (a-frā'ni-us), a Roman comic dramatist who flourished about the beginning of the first century B.C., and of whose writings only fragments remain.

Africa (af-ri-ka), one of the three great divisions of the Old World, and the second in extent of the

Africa

five principal continents of the globe, forming a vast peninsula joined to Asia by the Isthmus of Suez. It is of a compact form, with few important projections or indentations, and has therefore a very small extent of coast-line (about 18,000 miles, or much less than that of Europe) in proportion to its area. This continent extends from 37° 20' N. lat. to 34° 50' S. lat., and the extreme points, Cape Blanco and Cape Agulhas, are nearly 5000 miles apart. From west to east, between Cape Verde, lon. 17° 34' W. and Cape Guardafui, lon. 51° 16' E., the distance is about 4600 miles. The area is estimated at 11,500,000 square miles, or more than three times that of Europe. The islands belonging to Africa are not numerous, and, except Madagascar, none of them are large. They include Madeira, the Canaries, Cape Verde Islands, Fernando Po, Prince's Island, St. Thomas, Ascension, St. Helena, Mauritius, Bourbon, the Comoros, Socotra, etc.

The interior of Africa has recently been so well explored that its surface characteristics are known. One of these is that almost all round it at no great distance from the sea, and, roughly speaking, parallel with the coast-line, we find ranges of mountains or elevated lands forming the outer edges of interior plateaux. The most striking feature of Northern Africa is the immense tract known as the Sahara or Great Desert, which is inclosed on the north by the Atlas Mountains (greatest height, 12,000 to 13,000 feet), the plateau of Barbary and that of Barca, on the east by the mountains along the west coast of the Red Sea, on the west by the Atlantic Ocean, and on the south by the Soudan. The Sahara is by no means the sea of sand it has sometimes been represented: it contains elevated plateaux and even mountains radiating in all directions, with habitable valleys between. A considerable nomadic population is scattered over the habitable parts, and in the more favored regions there are settled communities. The Soudan, which lies to the south of the Sahara, and separates it from the more elevated plateau of Southern Africa, forms a belt of pastoral country across Africa, and includes the countries on the Niger, around Lake Tchad (or Chad), and eastwards to the elevated region of Abyssinia. Southern Africa as a whole is much more fertile and well watered than Northern Africa, though it also has a desert tract of considerable extent (the Kalahari Desert). This division of the continent consists of a table-land, or series of table-lands, of considerable elevation and great diversity

of surface, exhibiting hollows filled with great lakes, and terraces over which the rivers break in falls and rapids, as they find their way to the low-lying coast tracts. The mountains which inclose Southern Africa are mostly much higher on the east than on the west, the most northerly of the former being those of Abyssinia, with heights of 10,000 to 14,000 or 16,000 feet, while the eastern edge of the Abyssinian plateau presents a steep unbroken line of 7000 feet in height for many hundred miles. Farther south, and between the great lakes and the Indian Ocean, we find Mounts Kenia and Kilimanjaro (19,500 ft.), the loftiest in Africa, covered with perpetual snow. Of the continuation of this mountain boundary we shall only mention the Drakenberg Mountains, which stretch to the southern extremity of the continent, reaching in Cathkin Peak, Natal, the height of over 10,000 feet. Of the mountains that form the western border the highest are the Cameroon Mountains, which rise to a height of 13,000 feet, at the inner angle of the Gulf of Guinea. The average elevation of the southern plateau is probably from 3000 to 4000 feet.

The Nile is the only great river of Africa which flows to the Mediterranean. It receives its waters primarily from the great lake Victoria Nyanza, which lies under the equator, and in its upper course is fed by tributary streams of great size, but for the last 1200 miles of its course it has not a single affluent. It drains an area of more than 1,000,000 square miles. The Indian Ocean receives numerous rivers; but the only great river of South Africa which enters that ocean is the Zambesi, the fourth in size of the continent, and having in its course the Victoria Falls, one of the greatest waterfalls in the world. In Southern Africa also, but flowing westward and entering the Atlantic, is the Congo, which takes origin from a series of lakes and marshes in the interior, is fed by great tributaries, and is the first in volume of all the African rivers, carrying to the ocean more water than the Mississippi. Unlike most of the African rivers, the mouth of the Congo forms an estuary. Of the other Atlantic rivers, the Senegal, the Gambia, and the Niger are the largest, the last, which traverses the western Soudan, being third among African streams.

With the exception of Lake Tchad there are no great lakes in the northern division of Africa, whereas in the pumber and magnificence of its lakes the southern division almost rivals North America. Here are the Victoria and Albert Nyanza,

Lakes Tanganyika, Nyassa, Shirwa, Bangweolo, Moero, and others. Of these the Victoria and Albert belong to the basin of the Nile; Tanganyika, Bangweolo, and Moero to that of the Congo; Nyassa, by its affluent the Shire, to the Zambesi. Lake Tchad on the borders of the northern desert region, and Lake Ngami on the borders of the southern, have a remarkable resemblance in position, and in the fact that both are drained by streams that lose themselves in the sand. The climate of Africa is mainly influenced by the fact that it lies almost entirely within the tropics. In the equatorial belt, both north and south, rain is abundant and vegetation very luxuriant, dense tropical forests prevailing for about 10° on either side of the line. To the north and south of the equatorial belt the rainfall diminishes, and the forest region is succeeded by an open pastoral and agricultural country. This is followed by the rainless regions of the Sahara on the north and the Kalahari Desert on the south, extending beyond the tropics, and bordering on the agricultural and pastoral countries of the north and south coasts, which lie entirely in the temperate zone. The low coast regions of Africa are almost everywhere unhealthy, the Atlantic coast within the tropics being the most fatal region to Europeans.

Among mineral productions may be mentioned gold, which is found in the rivers of West Africa (hence the name Gold Coast), and in Southern Africa latterly in much abundance; diamonds have been found in large numbers in recent years in the south; iron, copper, lead, tin, and coal are also found.—Among plants are the baobab, the date-palm (important as a food plant in the north), the doum-palm, the oil-palm, the wax-palm, the shea-butter tree, trees yielding caoutchouc, the papyrus, the castor-oil plant, indigo, the coffee-plant, heaths with beautiful flowers, aloes, etc. Among cultivated plants are wheat, maize, millet, and other grains, cotton, coffee, cassava, ground-nut, yam, banana, tobacco, various fruits, etc. As regards both plants and animals, northern Africa, adjoining the Mediterranean, is distinguished from the rest of Africa in its great agreement with southern Europe.—Among the most characteristic African animals are the lion, hyena, jackal, gorilla, chimpanzee, baboon, African elephant (never domesticated, yielding much ivory to trade), hippopotamus, rhinoceros, giraffe, zebra, quagga, antelopes in great variety and immense numbers.—Among birds are the ostrich, the secretary-bird or serpent-eater, the honey-guide, cuckoo, sacred ibis,

guinea fowl.—The reptiles include the crocodile, chameleon, and serpents of various kinds, some of them very venomous. Among insects are locusts, scorpions, the tsetse-fly whose bite is fatal to cattle, and to which is attributed the deadly sleeping sickness, and white ants.

The great races of which the population of Africa mainly consists are the Hamites, the Semites, the Negroes, and the Bantus. To the Semitic stock belong the Arabs, who form a considerable portion of the population in Egypt and along the north coast, while a portion of the inhabitants of Abyssinia are of the same race (though the blood is considerably mixed). The Hamites are represented by the Copts of Egypt, the Berbers, Kabyles, etc., of Northern Africa, and the Somali, Danakil, etc., of East Africa. The Negro races occupy a vast territory in the Soudan and Central Africa, while the Bantus occupy the greater part of Southern Africa from a short distance north of the equator, and include the Kaffres, Bechuanas, Swahili, and allied races. In the extreme southwest are the Hottentots and Bushmen (the latter a dwarfish race). In the central forests is a race of dwarfs, usually known as Pygmies. In Madagascar there is a large Malay element. To these may be added the Fulahs on the Niger and the Nubians on the Nile and elsewhere, who are of a brownish color, and are often regarded as distinct from the other races, though sometimes classed with the Negroes. In religion a great proportion of the inhabitants are heathens of the lowest type; Mohammedanism possesses a large number of adherents in North Africa, and is rapidly spreading in the Soudan; Christianity prevails only among the Copts, the Abyssinians, and the natives of Madagascar, the latter having been converted in recent times. Elsewhere the missionaries seem to have made but little progress. Over great part of the continent civilization is at a low ebb, yet in some parts the natives have shown considerable skill in agriculture and various mechanical arts, as in weaving and metal working. Of African trade two features are the caravans that traverse great distances, and the trade in slaves that has long prevailed but has now been almost wholly brought to an end. Among articles exported from Africa are palm-oil, diamonds, ivory, ostrich feathers, wool, cotton, esparto, caoutchouc, etc. The total population is estimated at 170,000,000. Of these a small number are of European origin—French in Algeria, British and Dutch at the south, and growing num-

bers of Europeans in East and West Africa.

Practically the only independent state in Africa is Abyssinia. Liberia, the negro republic, founded in 1816, is under the direct supervision of the United States. The rest of the continent is parcelled up among the European powers. England's possessions consist of the Union of South Africa (comprising the Cape of Good Hope, Natal, Transvaal, and Orange Free State), Nigeria, Rhodesia, Bechuanaland, Uganda, Gold Coast, Nyassaland, the Sudan, Egypt, Uganda, Somaliland, East Africa, and a number of smaller sections. The German colonies in Africa at the beginning of the Great War were: German East Africa, German Southwest Africa, Togoland and the Cameroons, all of which were captured by the British and allied forces by the beginning of 1918. France holds Algeria, Tunis, Senegambia, much of the Sahara, French Congo, French Somali, Madagascar and islands. Italy has Tripoli, Italian Somali, Eritrea. Portugal: Angola, Congo, Guinea, East Africa, and islands. Spain: Rio de Oro, Adrar, Fernando Po, and islands. Belgium: the Congo. The Congo Free State ceased to exist after November 28, 1907, being annexed by the kingdom of Belgium on that date.

The name Africa was given by the Romans at first to a small district in the immediate neighborhood of Carthage, from which it has spread to the whole continent. The Greeks called Africa Libya, and the Romans often used the same name. The first African exploring expedition on record was sent by Pharaoh Necho about the end of the seventh century B. C. to circumnavigate the continent. The navigators, who were Phoenicians, were absent three years, and according to report they accomplished their object. Fifty or a hundred years later, Hanno, a Carthaginian, made a voyage down the west coast and seems to have got as far as the Bight of Benin. The east coast was probably known to the ancients as far as Mozambique and the island of Madagascar. Of modern nations the Portuguese were the first to take in hand the exploration of Africa. In 1433 they doubled Cape Bojador, in 1441 reached Cape Blanco, in 1442 Cape Verde, in 1462 they discovered Sierra Leone. In 1484 the Portuguese Diego Cam discovered the mouth of the Congo. In 1486 Bartholomew Dias rounded the Cape of Good Hope and reached Algoa Bay. A few years later a Portuguese traveler visited Abyssinia. In 1497 Vasco da Gama, who was commissioned to find a route by sea to India, sailed round the southern extremity as far as

Zanzibar, discovering Natal on his way. The first European settlements were those of the Portuguese in Angola and Mozambique, soon after 1500. In 1650 the Dutch made a settlement at the Cape. In 1770 James Bruce reached the source of the Blue Nile in Abyssinia. For the exploration of the interior of Africa, however, little was done until the nineteenth century.

Modern African exploration may be said to begin with Mungo Park, who reached the upper course of the Niger (1795-1805). Dr. Lacerda, a Portuguese, about the same time reached the capital of the Casembe, in the center of South Africa, where he died. In 1802-3 two Portuguese traders crossed the continent from Angola, through the Casembe's dominions, to the Portuguese possessions on the Zambesi. In 1822-24 extensive explorations were made in Northern and Western Africa by Denham, Clapperton, and Oudney, who proceeded from Tripoli by Murzuk to Lake Tchad, and explored the adjacent regions; Laing, in 1826, crossed the desert from Tripoli to Timbuctoo; Caillie, leaving Senegal, made in 1827-28 a journey to Timbuctoo, and thence through the desert to Morocco. In 1830 Lander traced a large part of the course of the Niger downward to its mouth, discovering its tributary, the Benue. In the south Livingstone, who was stationed as a missionary at Kolobeng, set out from that place in 1849 and discovered Lake Ngami. In 1851 he went north again, and came upon numerous rivers flowing north, affluents of the Zambesi. In 1848 and 1849 Krapf and Rehmman, missionaries in East Africa, discovered the mountains Kilimanjaro and Kenia. An expedition sent out by the British government started from Tripoli in 1850 to visit the Sahara and the regions around Lake Tchad, the chiefs being Richardson, Overweg, and Barth. The last returned alone in 1855, having carried his explorations over 2,000,000 sq. miles of this part of Africa, hitherto almost unknown. In 1853-56 Livingstone made an important series of explorations. He first went northwestwards, tracing part of the Upper Zambesi, and reached St. Paul de Loanda on the west coast in 1854. On his return journey he followed somewhat nearly the same route till he reached the Zambesi, and proceeding down the river, and visiting its falls, called by him the Victoria Falls, he arrived at Quillmane at its mouth on 20th May, 1856, thus crossing the continent from sea to sea. In 1858 he resumed his exploration of the Zambesi regions, and in various journeys visited Lakes Shirwa

and Nyassa, sailed up the Shire to the latter lake, and established the general features of the geography of this part of Africa, returning to England in 1864. By this time the great lakes of equatorial Africa were becoming known, Tanganyika and Victoria having been discovered by Burton and Speke in 1858, and the latter having been visited by Speke and Grant in 1862 and found to give rise to the Nile, while the Albert Nyansa was discovered by Baker in 1864. In 1866 Livingstone entered on his last great series of explorations, the main object of which was to settle the position of the watersheds in the interior of the continent, and which he carried on till his death in 1873. His most important explorations on this occasion were west and southwest of Tanganyika, including the discovery of Lakes Bangweolo and Moero, and part of the upper course of the river Congo (here called Luabala). For over two years he was lost to the knowledge of Europe till met with by H. M. Stanley (who had been sent to seek him) at Tanganyika in 1871. Gerhard Rohlfs, in a succession of journeys from 1861 to 1874, traversed the Sahara in various directions, and crossed the continent from Tripoli to Lagos by way of Murzuk, Bornu, etc. In 1873-75 Lieut. Cameron, reached and surveyed Lake Tanganyika, explored the country to the west of it, and then traveled to the southwest, finally reaching Benguela on the Atlantic coast. In 1874-77 Stanley went westward from Zanzibar to where Livingstone had struck the Congo and followed the river down to its mouth, thus finally tracing its course and completing a remarkable and valuable series of explorations. In 1879 Serpa Pinto completed a journey across the continent from Benguela to Natal, and in 1881-82 Wissman and Pogge crossed it again from St. Paul de Loanda to Zanzibar. In 1887-89 Stanley, sent to the rescue of Emin Bey, traversed the great equatorial forest, and crossed the continent by a new route. This period of discovery was followed by a period of partition, in which England and France were especially active, dividing the choicest portions of the continent between them with the exception of the great Congo Free State, the government of which was assigned by the powers to Belgium. Germany, Italy and Spain followed until very nearly the whole continent was appropriated. Within the twentieth century an active era of development has set in. Railway building is progressing, considerable progress having been made in the building of the Cape-to-Cairo railway, the European rule is grow-

African Methodist Episcopal Church

Agassiz

ing more pronounced, and the British colonies in South Africa have combined into a federal union.

African Methodist Episcopal Church, organized in Philadelphia in 1816 withdrew from the M. E. Church to have larger privileges and more freedom of action. It has general and annual conferences, bishops, etc. It exists principally in the South and numbers about 650,000 members.

African Methodist Episcopal Zion Church, organized in New York, 1820, for its adherents to 'have an opportunity to exercise their spiritual gifts among themselves.' Lay representation is a prominent feature in its polity, and women can be ordained as preachers. It has now nearly 550,000 members.

Africander (afri-kan-der), a name applied to the descendants of European parents born in South Africa. As these are largely of Dutch descent, an association called the 'Africander Bund' became prominent in Cape Colony after the Transvaal War, its purpose being to extend the political influence of the Dutch population.

African Railway. A railway from Congo, to Lake Tanganyika, finished in March, 1915, completes a line of steam transportation across Africa by land and water, from the Atlantic to the Indian Ocean.

Afterdamp, the term applied to the suffocating gas, chiefly consisting of carbonic acid gas, which remains in a coal mine after an explosion of firedamp.

Afterglow, the brilliant twilight color seen in the western sky after sunset. Those seen before sunrise are called foreglows. The most striking example of the afterglow was that which succeeded the volcanic eruption of Krakatoa in 1883, when this phenomenon was of striking brilliancy and duration. It was ascribed to the volume of fine volcanic dust spread throughout the atmosphere and reflecting the rays of the vanished sun, and continued for a number of years, being visible at intervals until 1888.

Agamemnon (a-ga-mem'non), in Greek mythology, son of Atreus, King of Mycenae in Argolis, brother of Menelaus, and commander of the allied Greeks at the siege of Troy. He was the father of Orestes, Iphigenia, and Electra, and husband of Clytemnestra, who brought about his murder.

Agamogenesis (-jen'e-sis; Gr. *agē*, priv., *gamos*, marriage, *genesis*, reproduction), the production of young without the congress of the sexes, one of the phenomena of alternate generation. See *Generation*.

Aganippe (-nip'ē), a fountain on Mount Helicon, in Greece, sacred to the Muses, which had the property of inspiring with poetic fire whoever drank of it.

Agape (ag'a-pē; Gr. *agapē*, love), in ecclesiastical history, the love-feast or feast of charity, in use among the primitive Christians, when a liberal contribution was made by the rich to feed the poor. During the first three centuries love-feasts were held in the churches without scandal, but in aftertimes the heathen began to tax them with impurity, and they were condemned at the Council of Carthage in 397. Some modern sects, as the Wesleyans, Sandemanians, Moravians, etc., have attempted to revive this feast.

A'gar-a'gar, a dried sea-weed of the Asiatic Archipelago, the *Gracilaria lichenoides*, much used in the East for soups and jellies, and also by the paper and silk manufacturers of Eastern Asia as an ingredient in some classes of their goods. Used also as a culture medium to grow bacteria upon.

Agaric (*Agaricus*), a large and important genus of fungi, characterized by having a fleshy cap or pileus, and a number of radiating plates or gills on which are produced the naked spores. The majority of this species are furnished with stems, but some are attached to the objects on which they grow by their pileus. Many of the species are edible, like the common mushroom.

Agaric Mineral, or MOUNTAIN-MEAL, one of the purest of the native carbonates of lime, found chiefly in the clefts of rocks and at the bottom of some lakes in a loose or semi-indurated form resembling a fungus. The name is also applied to a stone of loose consistence found in Tuscany, of which bricks may be made so light as to float in water, and of which the ancients are supposed to have made their floating bricks.

Agassiz (ag'as-ē), ALEXANDER, only son of J. L. R. Agassiz, born at Neuchâtel, Switzerland, in 1835, died March 27, 1910. He became assistant and then chief curator of the Museum of Comparative Zoölogy at Harvard. In 1875 he founded the zoölogical station at Newport, R. I. He was specially distinguished for his studies in marine zoölogy, and gained wealth through copper-mining enterprises near Lake Superior.

Agassiz, JEAN LOUIS RODOLPHE, an eminent naturalist, born 1807; died 1873, son of a Swiss Protestant clergyman at Motiers, near the eastern extremity of the Lake of Neuchâtel. He completed his education at Lausanne, and early developed a love of the natural sciences. He studied medicine at Zürich, Heidelberg, and Munich. His attention was first specially directed to ichthyology by being called on to describe the collection of fishes brought to Europe from Brazil by Martius and Spix. This work was published in 1829, and was followed in 1830 by *Histoire Naturelle des Poissons d'eaux douces de l'Europe Centrale* (Freshwater Fishes of Central Europe). Directing his attention to fossil ichthyology, five volumes of his *Recherches sur les Poissons Fossiles* appeared between 1834 and 1844. His researches led him to propose a new classification of fishes, which he divided into four classes, distinguished by the characters of the skin, as ganoids, placoids, cycloids, and ctenoids. His system has not been generally adopted, but the names of his classes have been used as useful terms. In 1836 he began the study of glaciers, and in 1840 he published his *Etudes sur les Glaciers*; in 1847 his *Système Glaciaire*. From 1832 he had been professor of natural history at Neuchâtel, when in 1846 pressing solicitations and attractive offers induced him to settle in America, where he delivered a series of lectures on zoölogy, and later became connected in a teaching capacity with Harvard University. After his arrival in America he engaged in various investigations and explorations, and published numerous works, including *Principles of Zoölogy*, in connection with Dr. A. Gould (1848); *Contributions to the Natural History of the United States* (four vols., 1857-62); *Zoölogie Générale* (1854); *Methods of Study in Natural History* (1863). In 1865-66 he made zoölogical excursions and investigations in Brazil, which were productive of most valuable results. Agassiz held views on many important points in science different from those which prevailed among the scientific men of the day, and in particular he strongly opposed the evolution theory.

Agassiz (ag'a-sē), MOUNT, an extinct volcano in Arizona, 10,000 feet in height; a place of summer resort, near the Great Cañon of the Colorado.

Agate (ag'at), a siliceous, semipellucid compound mineral, consisting of bands or layers of various colors blended together, the base generally being chalcedony, and this mixed with variable proportions of jasper, amethyst, quartz,

opal, heliotrope, and carnelian. The varying manner in which these materials are arranged causes the agate when polished to assume some characteristic appearances, and thus certain varieties are distinguished, as the ribbon agate, the fortification agate, the zone agate, the star agate, the moss agate, the clouded agate, etc. In Scotland they are cut and polished under the name of Scottish pebbles.

Agatharchus (ag-a-thar'kus), a noted Greek painter, native of Samos, the first to apply the rules of perspective to theatrical scene-painting; flourished about 480 B.C.

Agathias (a-gā'thi-as), a Greek poet and historian, born at Myrina, Asia Minor, about 536 A.D.; author of an anthology, a collection of love poems, and a history (553-558 A.D.), which, with all its blemishes, is a valuable chronicle of events during an eventful period of Roman history.

Agathocles (a-gath'o-klēs), a Sicilian Greek, one of the boldest adventurers of antiquity, born 361 B.C. By his ability and energy, and being entirely unscrupulous, he raised himself from the position of a potter to that of sovereign of Syracuse and master of Sicily. Wars with the Carthaginians were the chief events of his life. He died (was poisoned) at the age of seventy-two, or, as some say, ninety-five.

Agathon (ag'a-thon), or AGATHO, a Greek tragic poet, a friend of Euripides, and contemporary with Socrates and Alcibiades, born about 447 B.C.; died about 400 B.C. The dinner which he gave to celebrate his first dramatic victory was made the groundwork of Plato's *Symposium*.

Agave (a-gā'və), a genus of plants, nat. order Amaryllidaceæ (which includes the daffodil and narcissus), popularly known as American aloes. They are generally large, and have a massive tuft of fleshy leaves with a spiny apex. They live for many years—ten to seventy according to treatment—before flowering. When this takes place the tall flowering stem springs from the center of the tuft of leaves, and grows very rapidly until it reaches a height of 15, 20, or even 40 feet, bearing in its upper portion a large number of flowers. The best-known species is *A. americana* (common American aloe), introduced into Europe 1561, and now extensively grown in the warmer parts of that continent as well as in Asia (India in particular). This and other species yield various important products. The sap when fermented yields a beverage resembling cider, called by the Mexicans

pulque. The leaves are used for feeding cattle; the fibers of the leaves (sometimes called *pita* hemp or flax) are formed into



American Aloe (*Agave americana*).

thread, cord, and ropes; an extract from the leaves is used as a substitute for soap; slices of the withered flower-stem are used as razor-strops.

Agde (agd), a seaport of southern France, department of Hérault, with a cathedral, an ancient and remarkable structure. The trade, chiefly coasting, is extensive. Pop. 8827.

Age, a period of time representing the whole or a part of the duration of any individual thing or being, but used more specifically in a variety of senses. In law *age* is applied to the periods of life when men and women are enabled to do that which before, for want of years and judgment, they could not legally do. Certain rights are acquired in various countries at fixed periods of age, full legal age in English-speaking countries being twenty-one years, which age is completed on the day preceding the anniversary of a person's birth, who till that time is an infant, and is so styled in law. At full age (twenty-one years) citizens in the United States can vote, and can hold office except in certain special cases, such as a representative in Congress, who must be at least twenty-five years of age, a senator, thirty years, and the President, thirty-five years. The military age is from eighteen to forty-five years.

The term is also applied to designate

the successive epochs or stages of civilization in history or mythology. Hesiod speaks of five distinct ages:—1. *The golden or Saturnian age*, a patriarchal and peaceful age. 2. *The silver age*, licentious and wicked. 3. *The brazen age*, violent, savage, and warlike. 4. *The heroic age*, which seemed an approximation to a better state of things. 5. *The iron age*, when justice and honor had left the earth. The term is also used in such expressions as the *dark ages*, the *middle ages*, the *Elizabethan age*, etc.

The *Archæological Ages or Periods* are three—the Stone Age, the Bronze Age, and the Iron Age, these names being given in accordance with the materials chiefly employed for weapons, implements, etc., during the particular period. The Stone Age of Europe has been subdivided into two—the Palæolithic or earlier, and Neolithic or later. The word *age* in this sense has no reference to the lapse of time, but simply denotes the stage at which a people has arrived in its progress towards civilization; thus there are races still in their stone age.

Agen (â-zhap), one of the oldest towns in France, capital of dep. Lot-et-Garonne, on the Garonne, 74 miles southeast of Bordeaux; see of a bishop; manufactures sailcloth, woollens and linens, etc., and has an extensive trade. Pop. (1906) 18,640.

Agent (â-jent), a person appointed by another to act for or perform any kind of business for him, the latter being called in relation to the former the *principal*. An agent may be general or special. The acts of a general agent bind his principal, although the agent may violate his private instructions. An agent, without special authority, cannot appoint another person in his stead.

Ageratum (ag-er-â-tum), a genus of composite plants of the warmer parts of America, one species of which, *A. mexicanum*, is a well-known flower-border annual with dense lavender-blue heads.

Agésilas (a-jes-i-lâ-us), a King of Sparta, born in 442 B.C., and elevated to the throne after the death of his brother, Agis II. He acquired renown by his exploits against the Persians, Thebans, and Athenians. Though a vigorous ruler, and almost adored by his soldiers, he was of small stature and lame from his birth. He died in Egypt in the winter of 361–360 B.C. Xenophon, Plutarch, and Cornelius Nepos are among his biographers.

Agglomerate (a-glom'e-rât), in geology, a collective name

for masses consisting of angular fragments ejected from volcanoes. When the mass consists of fragments worn and rounded by water it is called a *conglomerate*.

Agglutinate Languages (a-glū-ti-nāt),

languages in which the modifying suffixes are, as it were, glued on to the root, both it and the suffixes retaining a kind of distinctive independence and individuality, as in the Turkish and other Turanian languages, and the Basque language.

Aghrim, or **AUGHRIM** (a'grim), a village in the county of Galway in Ireland, memorable for a decisive victory gained in the neighborhood, July 12, 1691, by the forces of William III, under Ginkel, over the Irish and French troops, under St. Ruth.

Agila (ag'i-la), a resinous perfume obtained apparently from *Aquilaria agallocha*. See *Agallochum*.

Agincourt (a-zhan-kör), a village of Northern France, department Pas de Calais, famous for the battle of October 25, 1415, between the French and English. Henry V, King of England, eager to conquer France, landed at Harfleur, took the place by storm, and wished to march through Picardy to Calais, but was met by a French army under the Constable d'Albret. The English numbered about 15,000 men, while the French numbers are variously stated at from 50,000 to 150,000. The confined nature and softness of the ground were to the disadvantage of the French, who were drawn up in three columns unnecessarily deep. The English archers attacked the first division in front and in flank, and soon threw them into disorder. The second division fled on the fall of the Duc d'Alençon, who was struck down by Henry himself; and the third division fled without striking a blow. Of the French 10,000 were killed, including the Constable d'Albret, with six dukes and princes. The English lost 1600 men killed, among them the Duke of York, Henry's uncle. After the battle the English continued their march to Calais.

Agio (ä'ji-o), the difference between the real and the nominal value of money, as between paper money and actual coin: an Italian term originally. Hence *agiotage*, speculation on the fluctuating differences in such values.

Agira (ä-jä'rä), a town of Sicily southwest of Etna, anciently *Agryrium*. Pop. 17,738.

Agis (ä'jis), the name of four Spartan kings, the most important of whom was Agis IV, who succeeded to the throne in B. C. 244, and reigned four years.

He attempted a reform of the abuses which had crept into the state—his plan comprehending a redistribution of the land, a division of wealth, and the canceling of all debts. Opposed by his colleague Leonidas, advantage was taken of his absence in an expedition against the Ætolians, to depose him. Agis at first took sanctuary in a temple, but he was entrapped and hurriedly executed by his rival.

Agitato (ä-jä-tä'tō), a term used in music to denote a restless, emotional style.

Aglaia (a-glä'ya), in Greek mythology, one of the three Graces.

Agnano (ä-nyä'nō), formerly a lake of Italy west of Naples, occupying probably the crater of an extinct volcano, but now drained.

Agnates (ag'näts), in the civil law, relations on the male side, in opposition to *cognates*, relations on the female side.

Agnes, St., a saint who, according to the story, suffered martyrdom because she steadfastly refused to marry the son of the prefect of Rome, and adhered to her religion in spite of repeated temptations and threats, A. D. 303. She was first led to the stake, but as the flames did not injure her she was beheaded. Her festival is celebrated on the 21st of January.

Agnesi (ä-nyä'sē), **MARIA GAETANA**, a learned Italian lady, born at Milan in 1718. In her ninth year she was able to speak Latin, in her eleventh Greek; was a university professor. She died in 1799.

Agnew (ag'nō), **D. HAYES**, surgeon, was born in Lancaster Co., Pennsylvania, in 1818; died in 1892. An accomplished surgeon, he was a profound anatomist, and had wonderful skill and ease in operating. He became professor of surgery and honorary professor of clinical surgery at the University of Pennsylvania. He attained a world-wide reputation as one of the most skillful surgeons of the century, and was the author of *Practical Anatomy and The Principles and Practice of Surgery*.

Agni, the Hindu god of fire. He is celebrated in many of the hymns of the Rig Veda. He is often represented as of a red or flame color, two-faced, suggesting his destructive and beneficent character, and with three legs and seven arms. He is still worshipped in many parts of India as the personification of fire.

Agnolo, **D' BACCIO** (bäch'ō-dän'yo-lō), a Florentine wood-carver, sculptor, and architect; designed some of the finest palaces, etc., in Florence, such

as the Villa Borghese, the Palazzo Bartolini, etc.; born 1480; died 1543.



Agni—Moore's Hindu Pantheon.

Agnomen (ag-nō'men) (L.), an additional name given by the Romans to an individual in allusion to some quality, circumstance, or achievement by which he was distinguished, as *Africanus* added to P. Cornelius Scipio.

Agnone (an-yō'nā), a town of S. Italy, prov. of Molise, famous for the excellence of its copper wares. Pop. 6,606.

Agnostics (ag-nos'tiks; Gr. *a*, not, *gignōskein*, to know), a modern term applied to those who disclaim any knowledge of God or of the origin of the universe, holding that the mind of man is limited to a knowledge of phenomena and of what is relative, and that, therefore, the infinite, the absolute, and the unconditioned, being beyond all experience, are consequently beyond its range.

Ag'nus Cas'tus, a shrub, *Vites agnuscastus*, nat. ord. *Verbenaceae*, a native of the Mediterranean countries, with purple flowers and acrid, aromatic fruits. It had anciently the imagined virtue of preserving chastity—hence the term *castus* (L., chaste).

Agnus Dei (dē'i; L., 'the Lamb of God'), a term applied to Christ in John i, 29, and in the Roman Catholic liturgy a prayer beginning with the words 'Agnus Dei,' generally sung before the communion. The term is also commonly given to a medal, or more frequently a cake of wax, consecrated by the pope, stamped with the figure of a lamb supporting the banner of the cross; supposed to possess great virtues, such as preserving those who carry it in faith from accidents, etc.

Agonic Line (a-gon'ik) (Gr. *a*, not, and *gōnia*, an angle), in terrestrial magnetism a name applied to the line which joins all the places on the earth's surface at which the needle of the compass points due north and south, without any declination. This line, which varies from time to time, at present passes through S. America and N. America to the Magnetic North Pole, thence to the White Sea, south through the Persian Gulf, Indian Ocean, and Australia to the Southern Magnetic Pole.

Agora (ag'o-ra), the marketplace of a Greek town, corresponding to the Roman forum.

Agoraphobia (a-gō-rā-fō'bī-ā), in pathology, a morbid fear of crossing open places. It is a feature of some cases of neurasthenia.

Agos'ta. See *Augusta*.

Agouara (ā-gu-ā'rā), a name given to the crab-eating raccoon (*Procyon cancrivorus*) of S. America.

Agoutt (ā-gō), MARIE DE FLAVIGNY, COMTESSE D', a French writer of fiction, history, politics, philosophy, and art; daughter of Viscount de Flavigny; born at Frankfort in 1805; died at Paris 1876. She contributed many articles to the *Revue des Deux Mondes*, etc., under the name of *Daniel Stern*, and wrote *Histoire de la Révolution de 1848*; *Trois Journées de la Vie de Marie Stuart*; *Florence and Turin*, a series of artistic and political studies; *Dante and Goethe*; dialogues, and numerous romances, etc.

Agouta (ā-gō'ta), *Solenodon paradoxus*, an insectivorous mammal peculiar to Haiti, of the tanrec family, somewhat larger than a rat. It has the



Agouta (*Solenodon paradoxus*)

tail devoid of hair and covered with scales, the eyes small, and an elongated nose like the shrews. Another species (*S. Cubanus*) belongs to Cuba.

Agouti (a-gō'ti), the name of several rodent mammals, forming a family by themselves, genus *Dasyprocta*. There are eight or nine species, all belonging to S. America and the W. Indies. The common agouti, or yellow-rumped cavy (*D. agouti*), is of the size of a rab-

bit. It burrows in the ground or in hollow trees, lives on vegetables, doing much injury to the sugar-cane, is as voracious as a pig, and makes a similar grunting noise. Its flesh is white and well tasting.

Agra (ā'gra), a city of India, in the Northwest Provinces, on the right bank of the Jumna, 841 miles by rail from Calcutta. It is a well-built and handsome town and has various interesting structures, among which are the imperial palace, a mass of buildings erected by several emperors; the Moti Masjid or Pearl Mosque (both within the old and extensive fort); the mosque called the Jama Masjid (a cenotaph of white marble); and, above all, the Taj Mahal, a



Section of Taj Mahal, Agra.

mausoleum of the seventeenth century, built by the Emperor Shah Jehan to his favorite queen, of white marble, adorned throughout with exquisite mosaics. Agra has a trade in grain, sugar, etc., and some manufactures, including beautiful inlaid mosaics. It was founded in 1566 by the Emperor Akbar, and was a residence of the following emperors for over a century. Population 188,022. Agra division has an area of 10,139 sq. miles, and a pop. of 5,240,542.

Agraffe (a-graf'), a sort of ornamental buckle, clasp, or similar fastening for holding together articles of dress, etc., often adorned with precious stones.

Agram (og'rom), or ZAGREB, a city in the Austrian Empire, capital of Croatia and Slavonia, near the river Save; contains the residence of the ban or governor of Croatia and Slavonia, government buildings, cathedral (being the see of a Roman Catholic archbishop), university, theater, etc.; carries on an active trade, and manufactures tobacco, leather, and linens. Pop. (1910) 79,000.

Agraphia. See *Aphasia*.

Agrarian Laws (a-grā'ri-an), laws enacted in ancient Rome for the division of the public land that is, the lands belonging to the State (*ager publicus*). As the territory of Rome increased the public land increased the land of conquered peoples being always regarded as the property of the conqueror. The right to the use of the public land belonged originally only to the patricians or ruling class, but latterly the claims of the plebeians on it were also admitted, though they were often unfairly treated in the sharing of it. Hence arose much discontent among the plebeians, and various remedial laws were passed with more or less success. Indeed, an equitable adjustment of the land question between the aristocracy and the common people was never attained.

Agricola (ā-gric'ō-lā), CNAEUS JULIUS, lived from A.D. 37 to 93, a Roman consul under the Emperor Vespasian, and governor in Britain, the greater part of which he reduced to the dominion of Rome; distinguished as a statesman and general. His life, written by his son-in-law, the historian Tacitus, gives the best extant account of Britain in the early part of the period of the Roman rule. He was the twelfth Roman general who had been in Britain, but was the only one who effectually subdued the southern portion of it and reconciled the Britons to the Roman yoke. This he did by teaching them the arts of civilization and to settle in towns. He constructed the chain of forts between the Forth and the Clyde, defeated Gaius at the battle of the Grampians, and sailed round the island, discovering the Orkneys.

Agric'ola, GEORG (originally Bauer, that is, cultivator=*L. agricola*), born in Saxony 1490, died at Chemnitz 1555, German physician and mineralogist. Though tinged with the superstitions of his age, he made the first successful attempt to reduce mineralogy to a science, and introduced many improvements in the art of mining.

Agricola, JOHANN, the son of a sailor at Eisleben, was born in 1492, and called, from his native city, *master of Eisleben* (*magister Islebius*); one of the most active among the theologians who propagated the doctrines of Luther. In 1537, when professor in Wittenberg, he stirred up the Antinomian controversy with Luther and Melancthon. He afterwards lived at Berlin, where he died in 1568, after a life of controversy. Besides his theological works he composed a work explaining the common German proverbs.

Agricultural Credit, or **RURAL CREDIT**, credit extended to farmers. Plans proposed for organizing rural credit are: (1) co-operative credit societies; (2) government agricultural banks; (3) loans by national or state banks. The United States Currency Act (1913) provided that any national bank not in any of the 50 reserve cities might lend money on farm property up to 50 per cent. of its capital. The amount of money available for farm loans was estimated in 1914 at \$300,000,000. See *Federal Farm Loan Act*.

Agricultural Machinery and Implements, the use of which has been greatly increased in recent years through improvements and additions, has largely relieved the manual labor and enormously extended the area of cultivation, besides bringing lightened work and increased efficiency in farm life.

TILLAGE IMPLEMENTS. The first in importance is the plow. From the ancient plow of the Orient, a forked instrument terminating in a curved point and operated by a handle, has developed the steel plow, the sulky and the disk plow operated by horse and traction engine. Various modifications adapt the implements to different soils. The most common form is the mold-board plow, which is made in sizes having a range of from 6 to 18 inches, those of 12 and 14 inches being generally used. The three types in general use are the walking plow, the sulky plow, and the gang plow. With the latter, of two 12-inch bottoms, 25 to 26 inches of soil may be turned, the work requiring four horses. Rolling coulters, standing coulters and jointers are attachments for preventing clogging, covering trash and reducing the draft. The center of draft should fall directly behind the center of the team. In the large level farms of the West tractors in large units are employed, but they are unsuited to the smaller and more divided farms in other sections, hence the building of smaller and more compact machinery has taken a great stride and is being employed on farms of 160 acres or less.

The **Harrow** is second in importance to the plow. There are several forms of this implement, as smoothing, spring-toothed and disk, which again are of several different forms. The smoothing harrow, with frame of steel furnished with levers to set the teeth at the desired angle, is the most serviceable. Solid construction is of prime importance; the teeth should be quite sharp and the clamps holding them in place should be very firm.

Cultivators are of very wide use, in cleaning truck crops, for orchards, and for general inter-tilled crops, corn, cotton, potatoes and others. There are several forms and sizes requiring from one to four horses, and to operate either walking or riding.

Seeding machines have largely superseded hand seeding. **Broadcast Seeders** have long hoppers, are carried on two wheels, and fed by an agitator or by force. The former, which is the less satisfactory method, operates with a revolving agitator passing over each opening through which the seed passes and preventing stoppage. The bottoms of the hoppers have openings the size of which may be adjusted to control the rate of seeding. Even distribution is made by means of a vibrating board on which the seed falls, or by fan-shaped spouts through which it passes. The wheelbarrow seeder used in sowing grass and clover operates similarly, but it is not furnished with vibrating board or spouts. The advantage of the force feed is that it can be set to seed at any desired speed and uniformity is more nearly assured. These seeders are sometimes attached to disk harrows. If placed before the disks, the seed is somewhat deeply covered; if behind them, it will lie on the surface and must be covered by another harrow following the disk harrow.

Grain drills have been used for nearly two centuries, but their practical value in the United States has only been since the middle of the last century. They are now more extensively used than broadcast seeders, their chief advantage being in a uniform depth of planting that is controlled to suit the kind of seed and the condition of the soil. They also save seed as compared with the broadcast type, though they are more expensive, heavier of draft and slower in seeding. The earlier forms of hoe and shoe furrow openers have largely given place to the disk form, which is used singly or double. Sometimes press wheels are attached to follow the disks, to compact the soil covering the seed. Covering chains are also used, but these serve only to insure the covering of the seed. The seed is fed through tubes attached to the furrow openers, which are spaced about 7 inches apart, and these tubes are connected by flexible tubes with the seed box. Grass seed attachments, as well as those for fertilizers, may be used with the drills.

Corn Planters are among the most important of farm implements, as so much depends upon accuracy in planting the corn seed, to ensure efficient and economical tillage of the crop. The essential re-

quirements of a planter is a dropper capable of accurate adjustment so that the kernels of corn be not broken, and the plates selected to drop the desired number. The plates are of two forms, round-holed and edge-selection. The furrow openers are either curved runners, stub runners, single and double disks, the choice of which is governed by the character and condition of the soil and the absence or presence of trash. The frame of the machine is supported by either solid or open wheels, whose function is to cover the seed and compress the earth about it. The former has preferably a concave surface as it closes the furrow more thoroughly and leaves a track slightly raised at its center. The open wheel leaves a narrow ridge of loose earth in the center of the track directly over the corn, which has the advantage of preventing crusting of the soil over the seed when rain follows the planting. *Check-rows* are attachments to the planters to have the plants in rows in both directions, enabling cross cultivation.

Harvesting Machinery exhibits the most striking labor-saving improvements of all those affected in farm implements. The essential features of the *Mowing Machine* are the cutting bar, guards and sickle, and the gearing that transmits the power employed from the wheels to the cutting parts. The adjustment for regulating the height of the cutting is very important, and also that for readily elevating the cutting bar to escape obstructions in its path. The bearings should likewise be easy of adjustment so that they may be kept tight. The most usually employed machine is that having a six-foot cutting bar and is drawn by two horses.

The Self-Binder is a modern machine that largely displaced the Self-Rake Reaper, although the latter is still favored for harvesting certain crops, as buckwheat, flax, and clover for seed where the crops are large, because of its greater economy. The binder is a more or less complicated machine and calls for a thorough knowledge of its parts by the operator to ensure its smooth and efficient working. Its essential parts are a cutting device, elevators and binding apparatus, besides the reel and its several adjustments and the bundle carrier.

The Corn Harvester has developed from the binder and its cutting and binding parts are constructed on the same principles. Its use, however, requires stronger construction than that machine. The apparatus for conveying the stalks to the binder differs considerably from that of the self-binder. The machine is designed to cut a single row of corn at a time, and

is largely used in cutting green corn for the silo, as well as the matured corn.

The Threshing Machine of the modern type separates the grain from the straw, winnows out the chaff and waste, conveys the grain to the bag or wagon and delivers the straw to the stack. This machine is too complicated for popular description; it is rather a machine used on farms than a farm machine. That used by farmers individually is a small one relatively; its essential operating points are speed of cylinder, setting of the concaves, and the number of teeth to remove all grains from the heads, the speed of the fan, and the selection and adjustment of the sieves. The cylinder should be run at uniform speed, the fan should clean the grain but not blow the grain into the straw. Ample power, either steam, gasoline or electric, is necessary for rapid and efficient work.

The Corn Sheller used in the great corn-growing sections is a large machine that shells nearly all the corn that reaches the great markets, and, like the great modern thresher, is generally owned and operated for community work. The sheller used by the individual farmer is a small machine operated by hand or power, and is of two forms, the spring sheller and the cylinder sheller, the first of which comprises all hand and some of the power machines. This type does not break the cobs and is therefore preferred to the cylinder type, which, however, has the advantage of simpler construction and less liability to get out of order. With the larger shellers of these types a cleaning device is provided which separates chaff, husks and cobs from the shelled corn, and an elevator that elevates both the shelled corn and the cobs.

The Silage Cutter is now almost universally found on dairy farms. Its essential parts are a feeding table which has an endless apron for feeding the corn into the cutting device, the cutter head and the elevator. The cutter head has radial knives fastened directly to the flywheel, or spiral knives fastened to a shaft. The elevator is a tight metal tube through which a fan drives a blast of air, which carries the cut corn to the top of the silo.

The Manure Spreader is a very important implement, economic as to labor and advantageous as to results. The essential features are strength, good capacity, an apron that works freely, and a beater that spreads evenly. Good machines are adjustable to spread any quantity of manure that it is desired to apply.

Mention has already been made of the tractor on the farm. The most advantageous tractor for the average farm, probably, is of five tractive and ten-hp

horsepower which would operate one fourteen-inch or two ten-inch plows, besides providing the necessary power for the threshing machine and a small silage cutter and for driving the other implements to which power is requisite on the farm. There are many excellent makes of farm tractors on the market and their employment is being greatly extended in the eastern section. Of the type of tractor best fitted, the multi-cylinder engine is the more dependable for constant power and better speed. The initial cost is greater than that of the one-cylinder type, but their greater efficiency more than offsets this difference.

Agriculture (ag'ri-kul-tūr), is the art of cultivating the ground in order to raise grain and other crops for man and beast; including the art of preparing the soil, sowing and planting seeds, removing the crops, and also the raising and feeding of cattle and other live stock. This art is in all countries coeval with the first dawn of civilization. At how remote a period it must have been successfully practised in Egypt, Mesopotamia, and China we have no means of knowing. Egypt was renowned as a corn country in the time of the Jewish patriarchs, who themselves were keepers of flocks and herds rather than tillers of the soil. Among the ancient Greeks the implements of agriculture were very few and simple. Hesiod, the earliest writer on agriculture, wrote a poem on this subject as early as the eighth century B. C., and speaks of a plow consisting of three parts, the share-beam, the draught-pole, and the plow-tail, but antiquarians are not agreed as to its exact form. The ground received three plowings, one in autumn, another in spring, and a third immediately before sowing the seed. Manures were applied, and the advantage of mixing soils, as sand with clay or clay with sand, was understood. Seed was sown by hand, and covered with a rake. Grain was reaped with a sickle, bound in sheaves, thrashed, then winnowed by wind, laid in chests, bins or granaries, and taken out as wanted by the family, to be ground. Evidently the art had made considerable progress by that early date. Agriculture was highly esteemed among the ancient Romans. Cato, the censor, who was celebrated as a statesman, orator, and general, derived his highest honors from having written a voluminous work on agriculture. In his *Georgics* Virgil has thought the subject of agriculture worthy of being treated in the most graceful and harmonious verse. The Romans used a great many different implements of agriculture. The plow is represented by Cato as of two kinds, one

for strong, the other for light soils. Varro mentions one with two mold-boards, with which, he says, 'when they plow after sowing the seed, they are said to ridge.' Pliny mentions a plow with one mold-board, and others with a coulter, of which he says there were many kinds. Fallowing was a practice rarely deviated from by the Romans. In most cases a fallow and a year's crop succeeded each other. Manure was collected from nearly or quite as many sources as have been resorted to by the moderns. Irrigation on a large scale was applied both to arable and grass land.

The Romans introduced their agricultural knowledge among the Britons and other peoples of Europe, and during the most flourishing period of the Roman occupation large quantities of corn were exported from Britain to the Continent. During the time that the Angles and Saxons were extending their conquests over the British island agriculture must have been greatly neglected; but afterwards it was practised with some success among the Anglo-Saxon population, especially, as it was generally the case during the middle ages, on land belonging to the church. Swine formed at that time a most important portion of the live stock, finding plenty of oak and beech mast to eat. The feudal system, though beneficial in some respects as tending to ensure the personal security of individuals, operated powerfully against progress in agricultural improvements. War and the chase, the two ancient and deadliest foes of husbandry, formed the most prominent occupations of the feudal princes and nobles. Thriving villages and smiling fields were converted into deer forests, vexatious imposts were laid on the farmers, and the serfs had no interest in the cultivation of the soil. But the monks of every monastery retained such of their lands as they could most conveniently take charge of, and these they cultivated with great care, under their own inspection, and frequently with their own hands. The various operations of husbandry, such as manuring, plowing, sowing, harrowing, reaping, thrashing, winnowing, etc., are incidentally mentioned by the writers of those days; but it is impossible to collect from them a definite account of the manner in which those operations were performed.

The first English treatise on husbandry and the best of early modern works on the subject was published in the reign of Henry VIII (in 1534), by Sir A. Fitzherbert, judge of the Common Pleas. It is entitled the *Book of Husbandry*, and contains directions for draining, clearing, and inclosing a farm, for enriching the soil, and rendering it fit for

tillage. Lime, marl, and fallowing are strongly recommended. About 1645 the field cultivation of red clover was introduced into England, the merit of this improvement being due to Sir Richard Weston, author of a 'Discourse on the Husbandry of Brabant and Flanders.' The Dutch had devoted much attention to the improvement of winter roots, and also to the cultivation of clover and other artificial grasses, and the farmers and proprietors of England soon saw the advantages to be derived from their introduction. The cultivation of clover soon spread, and Sir Richard Weston seems also to have introduced turnips. Potatoes had been introduced during the latter part of the sixteenth century. In the eighteenth century the first name of importance in British agriculture is that of Jethro Tull, who advocated the sowing of crops in rows or drills with an interval between every two or three rows wide enough to allow of plowing or hoeing. By the end of the century it was a common practice to alternate green crops with grain crops, instead of exhausting the land with a number of successive crops of corn. A well-known writer on agriculture at this period, and one who did a great deal of good in diffusing a knowledge of the subject, was Arthur Young. In Europe at large the principal cereals at present are wheat, oats, maize, barley, and rye, wheat being mainly grown in the middle and southern regions, such as France, Spain, part of Germany, Austria, Hungary, Italy, and southern Russia, oats, barley and rye in the more northern portion, while maize is grown in the warmest parts. The most important of the cereals are wheat, rice and maize, the first being grown largely in the United States, Canada, Argentina and Australia; the second in China, Japan and India; and the last in the United States and Mexico.

The vast territory of the United States presents every variety of soil and climate. Its agriculture embraces all the products of European cultivation, together with some of those of the warmer countries, as cotton, sugar, and indigo. The agricultural implements are, in many respects, similar to those of Great Britain and France, but, as a general rule, those of the United States exceed all others in their wonderful adaptation for all purposes of cultivation and harvesting of crops. So successful have been our farming implements in repeated contests on European soil that their rapid introduction into foreign markets has only been impeded by the great demand at home. The disposition of the American to experiment, to test alleged improvements, and

adopt labor-saving expedients, is a great incentive to inventors. Nor is the spirit of investigation confined to invention. For one of the many instances of modern methods, see *Dry Farming*.

The American reaper was invented by McCormick in 1834; by many improvements it has secured the European as well as the home market. In 1857 the first American agricultural college was established. In 1862 the passage of the *Homestead* law served to accelerate the occupation of the public lands. In the same year Congress granted to each State 30,000 acres for each Senator and Representative in Congress in order to promote the liberal and practical education of the industrial classes. In 1867 the organization of the Patrons of Husbandry, commonly called Grangers, was effected, to look after the interests of farmers, to reduce the profits of middlemen, and to insist on fair treatment from the railroads. The American dairy system, based on the principle of association, has advanced rapidly. Agricultural societies, both State and county are established in all parts of the United States.

Through the efforts of the above-mentioned and other societies, the investigations of scientific men, and the general diffusion of knowledge among all classes, over two hundred periodicals being devoted to its interests, agriculture has made great progress during the recent centuries. Among the chief improvements we may mention deep plowing and thorough draining. By the introduction of new or improved implements the labor necessary to the carrying out of agricultural operations has been greatly diminished. Science, too, has been called in to act as the handmaid of art, and it is by the investigations of the chemist that agriculture has been put on a really scientific basis. The organization of plants, the primary elements of which they are composed, the food on which they live, and the constituents of soils, have all been investigated, and most important results obtained, particularly in regard to manures and rotations. Artificial manures, in great variety, to supply the elements wanted for plant growth, have come into common use, not only increasing the produce of lands previously cultivated, but extending the limits of cultivation itself. An improvement in all kinds of stock is becoming more and more general, feeding is conducted on more scientific principles, and improved varieties of plants used as field crops have been introduced. One of the recent developments in the United States is the introduction of the system of *ensilage* for preserving fodder in a green state, which has given

valuable results, and silos are adjuncts of modern farms throughout the country.

As a result of the new conditions, to be a thoroughly trained and competent agriculturist requires a special education, partly theoretical, partly practical. In some countries there are now agricultural schools and colleges supported by the State which give thorough courses in the theory and practice. In the United States nearly all the States have colleges, or departments of colleges, devoted to the teaching of agriculture, and large allotments of public land have been made for their support. In Germany such institutions are numerous and highly efficient, and in Europe generally the ground is cultivated more closely and yields more largely than in the United States. For teaching agriculture practically model farms have been widely established.

Experiments in the use of radium as a fertilizer have been made by Dr. H. H. Rusby, of the New York College of Pharmacy. He diluted three milligrams of radium in a ton of water, and this amount, he states, will thoroughly fertilize 20 acres of land at a cost of about \$30. Other successful experiments have been made by the New York Botanical Garden and the University of Prague.

Explosives have been used to good advantage in agriculture, and in 1914 farmers, nurserymen and orchardists of the United States used approximately 25,000 pounds of explosives in preparing land for cultivation and in increasing crop and fruit production. One of the most striking and thoroughly established uses of explosives in agriculture is for preparing ground for the planting of trees and in the treatment of old or diseased fruit, shade or ornamental trees, to give them renewed life. The method of blasting is very simple and the explosive is usually the low grade of dynamite known as farm powder.

Agriculture, DEPARTMENT OF, first established by Congress as a commissionership in 1862, was changed to a government department in 1880, having a Cabinet officer, the Secretary of Agriculture, at its head. It diffuses matter deemed advantageous to agricultural interests by issuing monthly and annual reports throughout the country and through the Secretary maintains control of animal quarantine stations, administers the interstate game laws, and exercises general supervision over the government experiment stations. It has several bureaus—the Bureau of Animal Industry; of Chemistry; of Plant Industry; of Forestry; of Soils; and the Weather Bureau; an Office of Experiment stations, many divisions, a library and propagating

grounds. At the latter plants received in exchange from foreign governments, botanic gardens and private persons are tested as to their suitability for being introduced in the United States. By this means many new and useful plants have become known here. Seeds are distributed free to those applying for them. Agricultural experiment stations have been introduced into all the states and territories. State and county agricultural fairs are very common, and through these varied means agriculture is rapidly advancing.

Agrirentum (a-gri-jen'tum), an ancient Greek city of Sicily (the modern *Girgenti*), founded about 580 B. C., and long one of the most important places on the island. Extensive ruins of splendid temples and public buildings yet attest its ancient magnificence. See *Girgenti*.

Ag'rimony (*Agrimonia*), a genus of plants, natural order Rosaceæ, consisting of slender perennial herbs found in temperate regions. *A. eupatoria*, or common agrimony, was formerly of much repute as a medicine. Its leaves and root-stock are astringent, and the latter yields a yellow dye.

Agrippa (a-grip'pæ). CORNELIUS HENRY, born in 1489, at Cologne, was a man of talents, learning, and eccentricity. In his youth he was secretary to the Emperor Maximilian I; he subsequently served seven years in Italy, and was knighted. On quitting the army he devoted himself to science, and became famous as a magician and alchemist, and was involved in disputes with the churchmen. After an active, varied, and eventful life he died at Grenoble in 1535.

Agrippa, HEROD. See *Herod Agrippa*.

Agrippa, MARCUS VIPSANIUS, a Roman statesman and general, the son-in-law of Augustus; born B. C. 63, died B. C. 12. He was prætor in B. C. 41; consul in 37, 28, and 27; ædile in 33; and tribune from 18 till his death. He commanded the fleet of Augustus in the battle of Actium. To him Rome is indebted for three of her principal aqueducts, the Pantheon, and several other works of public use and ornament.

Agrippina (ag-rip-pi'na), the name of several Roman ladies, among whom we may mention:—1. The youngest daughter of Marcus Vipsanius Agrippa, and wife of C. Germanicus; a heroic woman, adorned with great virtues. Tiberius, who hated her for her virtues and popularity, banished her to the island of Pandataria, where she starved herself to death in A. D. 33.—2.

A daughter of the last mentioned, and the mother of Nero, by Domitius Ahenobarbus. Her third husband was her uncle, the Emperor Claudius, whom she subsequently poisoned to secure the government of the empire through her son Nero. After ruling a few years in her son's name he became tired of her ascendancy, and caused her to be assassinated (A.D. 59).

Agrostem'ma. See *Lychnis*.

Agrostis (a-gros'tis), a genus of grasses, consisting of many species, and valuable as pasture and lawn grasses. The bent-grasses belong to the genus.

Agtelek (ag'te-lek), a village in Hungary, near the road from Pesth to Kaschau, with about 600 inhabitants, celebrated for one of the largest and most remarkable stalactitic caverns in Europe.

Agua (ag'wa), an active volcano of Central America, in Guatemala, rising to the height of 13,000 feet. It has twice destroyed the old city of Guatemala, in its immediate vicinity.

Aguara (a-gwä'ra). See *Agouara*.

Aguardiente (a-gwä-rä-en'te), a popular spirituous beverage of Spain and Portugal, a kind of coarse brandy, made from red wine, from the refuse of the grapes left in the wine-press, etc., generally flavored with anise; also a Mexican alcoholic drink distilled from the fermented juice of the agave.

Aguas Calientes (äg'wäs käl-lä-en'täs; lit. 'warm waters'), a town 270 miles N. W. of Mexico, capital of the state of its own name, named from the thermal springs near it; has manufactures of cottons and a considerable trade. Pop. 40,000.

Ague (ä'gü), malarial or intermittent fever. See *Malaria*.

Ague-cake, a tumor caused by enlargement and hardening of the spleen, often the consequence of ague, or intermittent or malarial fever.

Aguessean, D'. (ä-ges-s). HENRI FRANÇOIS, a distinguished French jurist and statesman, born at Limoges in 1688; was in 1690 advocate-general at Paris, and at the age of thirty-two procureur-général of the parliament. He risked disgrace with Louis XIV, by successfully opposing the famous papal bull *Unigenitus*. He was made chancellor in 1717, and was several times removed and restored, finally holding the office from 1737 to 1750. He died in 1751.

Aguilar (ä-gä-lär'), a town of Spain, province of Cordova, in Andalusia, in a good wine-producing district, and with a trade in corn and wine. Pop. 13,330.

Aguilar (ä-gä-lär'), GRACE, an English writer, born at Hackney 1816; died at Frankfort 1847. Of Jewish parentage, she at first devoted herself to Jewish subjects, but her fame rests on her novels, *Home Influence*, *A Mother's Recompense*, *Home Scenes* and *Heart Studies*, etc., most of which were published posthumously under the editorship of her mother.

Aguilas (ä-gä-läs), a flourishing seaport of southern Spain, province of Murcia, with copper and lead smelting works. Pop. 15,868.

Aguinaldo (ä-gwi-nal'dö), EMILIO, Philippine leader, born at Cavite, Luzon Island, in 1860. In 1896 he became active as an insurrectionist against the Spanish rule, and was chosen President of the patriotic Tagal Republic. After the capture of Manila by the Americans he became the leader in an insurrection against them, and conducted the subsequent war with signal ability, considering his paucity of means and the character of his troops. His army being dispersed, he carried on a guerrilla warfare, until captured by General Funston, March 23, 1901. Since then he has lived as a quiet but influential citizen.

Agulhas (ä-gul'yäs), CAPE, a promontory, forming the most southern extremity of Africa, about 90 miles southeast of the Cape of Good Hope, rising to 455 feet above the sea, with a lighthouse.

Agu'ti. See *Agouti*.

Ahab (ä'hab), the seventh King of Israel, succeeded his father Omri, 928 B.C., and reigned twenty years. At the instigation of his wife Jezebel he erected a temple to Baal, and became a cruel persecutor of the true prophets. He was killed by an arrow at the siege of Ramoth-Gilead.

Ahaggar (ä-hag'gar), a mountainous region of the Sahara, south of Algeria, with some fertile valleys, inhabited by the Tuaregs.

Ahasuerus (ä-has-yu-ä-rus), in Scripture history, a King of Persia, probably the same as Xerxes, the husband of Esther, to whom the Scriptures ascribe a singular deliverance of the Jews from extirpation.—AHASUERUS is also a Scripture name for Cambyses, the son of Cyrus (Esra, iv, 6), and for Astyages, King of the Medes (Dan. ix, 1).

Ahas (A'has), the twelfth King of Judah, succeeded his father Jotham, 742 B.C. Forsaking the true religion he gave himself up completely to idolatry, and plundered the temple to obtain presents for Tiglath-pileser, King of Assyria.

Ahaziah (A-ha-si'a):—1. Son of Ahab and Jezebel, and eighth King of Israel, died from a fall through a lattice in his palace at Samaria after reigning two years (B. C. 896, 895).—2. Fifth King of Judah, and nephew of the above. He reigned but one year, and was slain (B. C. 884) by Jehu.

Ahithophel (A-hith'o-fel), privy-councillor to David, and confederate and adviser of Absalom in his rebellion against his father. When Hushai's advice prevailed, Ahithophel, despairing of success, hung himself.

Ahmedabad, or AHMADABAD (A-med, A-bād'), a town of India, presidency of Bombay, in district of its own name, on the left bank of the Sabarmati, 310 miles north of Bombay. It was founded in 1412 by Ahmed Shah, and was converted by him into a great capital, adorned with splendid edifices. It came finally into the hands of the British in 1818. It is still a handsome and populous place, enclosed by a wall, with many noteworthy buildings; manufactures of fine silk and cotton fabrics, cloths of gold and silver, pottery, paper, enamel, mother-of-pearl, etc. Pop. 215,835.

Ahmed Mirza (A'med mēr'za), Shah of Persia, born in 1897. His father, Mohammed Ali Mirza, was deposed by revolutionaries July 16, 1906, and the son, a boy of 12, raised to the vacant throne under the regency of his uncle.

Ahmednagar (A-med-na'gar), a town of India, presidency of Bombay, in district of its own name, of commonplace appearance, surrounded by an earthen wall; with manufactures of cotton and silk cloths. Near the city is the fort, built of stone and 1 mile round. Pop. 43,032.

Ahmed Shah (A'med), born 1724; died 1773, founder of the Durāni dynasty in Afghanistan. On the assassination of Nadir he proclaimed himself shah, and set about subduing the provinces surrounding his realm. Among his first acts was the securing of the famed Koh-i-noor diamond, which had fallen into the hands of his predecessor. He crossed the Indus in 1748, and his conquests in northern India culminated in the defeat of the Mahrattas at Panipat (6th Jan., 1761). Affairs in his own country necessitated his withdrawal from

India, but he extended his empire in other directions far beyond the limits of modern Afghanistan. He was succeeded by his son Timur.

Ahriman (A'ri-man; in the Zend Avesta, *gromainyus*, 'spirit of evil or annihilation'), according to the dualistic doctrine of Zoroaster, the origin or the personification of evil, sovereign of the Devas or evil spirits, lord of darkness and of death, being thus opposed to Ormuzd (*Ahuramazda*), the spirit of good and of light.

Ahwas (A'was), a small Persian town on the river Karun, province of Khuzistan, in the immediate neighborhood of which are the vast ruins of a city, ascribed to the time of the Parthian empire, extending for 12 miles along the river side. Pop. 2,000.

Ai (A'i). See *Sloth*.

Aid (ād), a subsidy paid in the feudal period by vassals to their lords on certain occasions, the chief of which were: when their lord was taken prisoner and required to be ransomed, when his eldest son was to be made a knight, and when his eldest daughter was to be married and required a dowry. From the Norman conquest to the fourteenth century the collecting of aids by the crown was one of the forms of taxation, being latterly regulated by parliament.

Aidan, SAINT (A'dan), Bishop of Lindisfarne, was originally a monk of Iona, in which monastery Oswald I, who became King of Northumberland in 635, had been educated. At the request of Oswald, Aidan was sent to preach Christianity to his subjects, and established himself in Lindisfarne as the first of the line of bishops now designated of Durham. He died in 651.

Aide-de-camp (ād-dē-kān), a military officer who conveys the orders of a general to the various divisions of the army on the field of battle, and at other times acts as his secretary and general confidential agent.

Aidin (A-i-dēn'), or GUZEL HISSAR, a town in Asiatic Turkey, about 60 miles southeast of Smyrna, with which it is connected by rail; has fine mosques and bazaars, is the residence of a pasha, and has manufactures of morocco leather and an extensive trade in cotton, leather, figs, grapes, etc. Pop. 35,000.

Aigrette (A'gret) (French), a term used to denote the feathery crown attached to the seeds of various plants, such as the thistle, dandelion, etc. (called in botany *pappus*).—It is also applied to any head-dress in the form of

a plume, whether composed of feathers, flowers, or precious stones.

Aigues Mortes (ag mort; L. *Aqua Mortua*, 'dead waters'), a small town of southern France, near the mouths of the Rhone, department of Gard; with ancient walls and castle; near it are lagoons, from which great quantities of salt are secured. It was from this place that Louis IX embarked in 1248 and 1270 for the seventh and eighth crusades. Pop. (1906) 3577.

Aiguille (ā-gwēl; Fr., lit. a needle), a name given in the Alps to the needle-like points or tops of granite, gneiss, quartz, and other crystalline rocks and mountain masses; also applied to sharp-pointed masses of ice on glaciers and elsewhere.

Aigun (i-gun'), a town of China, in Manchuria, on the Amur, with a good trade. Pop. 15,000.

Aikin (ā'kin), JOHN, an English doctor and writer, born in 1747, died in 1822. He practised as a physician at Chester, Warrington, and London; turned his attention to literature and published various works of a miscellaneous description, including the popular *Evenings at Home* (1792-95), written with the view of popularizing scientific subjects. His *General Biographical Dictionary* was begun in 1799 and finished in 1815.

Aikman (ā'kman), WILLIAM, an eminent Scottish portrait-painter; born in Forfarshire in 1682; died in 1731. He studied at Edinburgh and in Italy, visited Turkey, and spent the later portion of his life in London, where he enjoyed the friendship of most of the distinguished men of Queen Anne's time.

Ailanto, *AILANTHUS* (ā-lan'thus), a tree, genus *Ailanthus*, nat. ord. Simarubacæ. The *A. glandulosa*, a large and handsome tree, with pinnate leaves one or two feet long, is a native of China, but has been introduced into Europe and the United States, where it is in favor for its elegant foliage. A species of silkworm, the ailanthus silkworm (*Saturnia cynthia*), feeds on its leaves, and the material produced, though wanting the fineness and gloss of mulberry silk, is produced at less cost, and is more durable. The wood is hard, heavy, glossy, and susceptible of a fine polish.

Ailred (ā'fred), (contracted form of Ethelred), a religious and historical writer, born 1109; died 1166; abbot of Rievaulx, in the north riding of Yorkshire. Wrote lives of Edward the Confessor and St. Margaret, Queen of Scotland, *Genealogy of the Kings of England*, *The Battle of the Standard*, etc.

Ailsa Craig (ā'sa crāg), a rocky islet in the Firth of Clyde, 10 miles from the coast of Ayr, of a conical form, 1114 feet high, and about 2 miles in circumference, precipitous on all sides except the northeast, where alone it is accessible, frequented by innumerable sea-fowl, including solan-geese, and covered with grass. On it is a lighthouse.

Ailu'rus. See *Panda*.

Aimard (ā-mār). GUSTAVE, a French novelist; born in 1818, died in 1893. He lived for ten years among the Indians of North America, and wrote a number of stories dealing with Indian life, which have been popular in English translations.

Ain (ap), a southeastern frontier department of France, mountainous in the east (ridges of the Jura), flat or undulating in the west, divided into two nearly equal parts by the river Ain, a tributary of the Rhone; area, 2248 square miles. Capital, Bourg. Pop. 345,856. The Ain river (118 miles long) traverses its center.

Ainmüller (in'mül-er), MAX EMANUEL, a German artist who may be regarded as the restorer of the art of glass-painting; born 1807, died 1870. As inspector of the state institute of glass-painting at Munich he raised this art to a high degree of perfection by the new or improved processes introduced by him. His son HEINRICH, born 1837, gained a high reputation in the same field.

Ainos (ī'nōz; that is, men), the native name of an uncivilized race of people inhabiting the Japanese island of Yesso, as also Saghalien, and the Kurile Islands, and believed to be the aboriginal inhabitants of Japan. They do not average over 5 feet in height, but are strong and active. They have matted beards 5 or 6 inches in length, and black hair which they allow to grow till it falls over their shoulders. Their complexion is dark brown, approaching to black. They worship the sun and moon, and pay reverence to the bear. They support themselves by hunting and fishing.

Ainsworth (ānz'worth), HENRY, a Puritan divine and scholar; born 1571, died 1622. He passed a great part of his life in Amsterdam, being from 1610 pastor of a 'Brownist' church there (the Brownists being forerunners of the Independents). He was a voluminous writer, a controversialist and commentator, and a thorough Hebrew scholar.

Ainsworth, ROBERT, born in Lancashire, 1600; died there in 1743. He is principally known as the

author of a long-popular Latin and English dictionary.

Ainsworth, WILLIAM FRANCIS, an English physician, geologist, and traveler; born 1807. He was surgeon and geologist to the Euphrates expedition under Col. Chesney, and published *Researches in Assyria, Babylonia, and Chaldaea* (1838), *Travels in Asia Minor, Mesopotamia, and Armenia* (1842), *Travels in the Track of the Ten Thousand Greeks* (1844), etc. Died 1890.

Ainsworth, WILLIAM HARRISON, an English novelist; born in 1805, died in 1882. He was the son of a Manchester solicitor, and intended for the profession of law, but devoted himself to literature. He wrote *Rookwood* (1834), *Jack Sheppard* (1839), and about forty other novels.

Ain-Tab (a-in-tāb'), a town of Northern Syria, 60 miles north of Aleppo; with manufactures of cottons, woollens, leather, etc., and an extensive trade. There is here an American Protestant mission. Pop. about 45,000.

Air (ār), the gaseous substance of which our atmosphere consists, being a mechanical mixture of 77.11 per cent. by measure of nitrogen, 20.65 per cent. of oxygen, argon (0.75-0.80), carbon dioxide 0.03, water-vapor (0.5-1.5). Traces of ammonia, sulphur dioxide, nitric acid, and other minor constituents. Oxygen is absolutely essential to animal life, while nitrogen serves to dilute it and is essential to plant life, though not in its gaseous state. Oxygen is more soluble in water than nitrogen, and hence the air dissolved in water contains about 10 per cent. more oxygen than atmospheric air. The oxygen, therefore, available for those animals which breathe by gills is somewhat less diluted with nitrogen, but it is very much diluted with water. For the various properties and phenomena connected with air see such articles as *Atmosphere*, *Aëronautics*, *Air-pump*, *Barometer*, *Combustion*, *Respiration*, etc.

Air, in music (in Italian, *aria*), a continuous melody, in which some lyric subject or passion is expressed. The lyric melody of a single voice, accompanied by instruments, is its proper form of composition. Thus we find it in the higher order of musical works; as in cantatas, oratorios, operas, and also independently in concertos. AIR is also the name often given to the upper or most prominent part in a concerted piece, and is thus equivalent to *treble*, *soprano*, etc.

Air, or **ASHEN**. See *Ashen*.

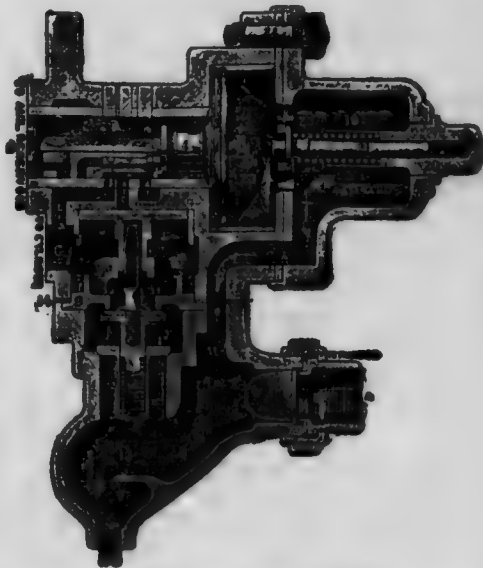
Aira. See *Hair-grass*.

Air Beds and Cushions, often used and invalids, are composed of India rubber or of cloth made air-tight by a solution of India rubber, and when required for use filled with air, which thus supplies the place of the usual stuffing materials.

Air-bladder. See *Swimming-bladder*.

Air-bone, a bone having a large cavity filled with air, as in birds; the atmösteon or ossified membranous tube conveying air to the bone of a bird.

Air-brake, an apparatus for utilizing the force of compressed air in applying brakes to the wheels of railroad cars to check the movement of the train. By this means a power enormously exceeding that of the old hand-brake can be applied, the train being quickly brought to a stop. The original air-brake was patented in 1869 by George Westinghouse, of Pittsburgh, Pa.,

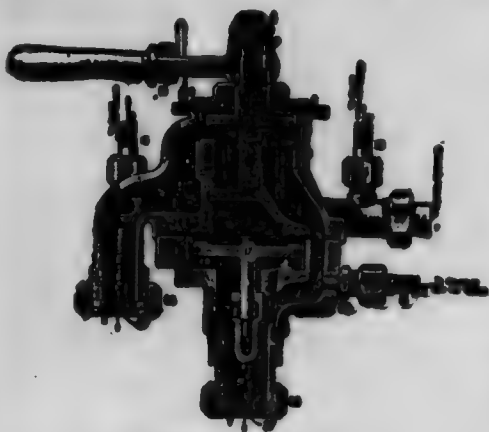


Quick-action Triple Valve.

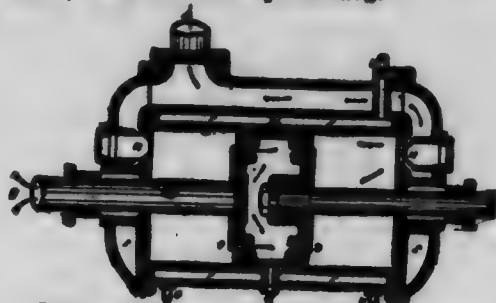
and has since then been greatly improved. Steam, drawn from the boiler, is the compressing power used, the air being compressed in a reservoir attached to the locomotive. There are pipes to convey the air to the brakes, and so adjusted with valves that they retain the compressed air in the event of the train separating. The term 'Vacuum Brakes' is used to distinguish a class of brakes operated by atmospheric pressure instead

of compressed air. The action of the brakes is under the control of the engineer, and by the use of them a passenger train moving sixty miles an hour

England. In some places adopted by the authorities as an adjunct to the police force, and known as police-dog.



Brake Valve (section).



Sergeant Air-compressor (section through cylinder).

can be stopped within 1,000 feet. By a United States law passed in 1893 power brakes are required to be used on freight as well as on passenger trains.

Air-cells, cavities in the cellular tissue of the stems and leaves of plants which contain air only, the juices of the plants being contained in separate vessels. They are largest and most numerous in aquatic plants, as in the *Vallisneria spiralis* and the *Victoria regia*, the gigantic leaves of which latter are buoyed up on the surface of the water by their means.

The minute cells in the lungs of animals are also called air-cells. There are also air-cells in the bodies of birds. They are connected with the respiratory system, and are situated in the cavity of the thorax and abdomen, and sometimes extend into the bones. They are most fully developed in birds of powerful and rapid flight, such as the albatross.

Air-compressor, any apparatus used for compressing air. Compressed air is used as a source of power not only in the air-brake (q. v.), but in motors of different kinds, in operating rock drills in tunnels, and for other purposes.

Airedale Terrier (ārdal), one of the largest and tallest of the terriers, weighing from 40 to 45 pounds, of a dark grizzle and tan color. A cross of several varieties; originated in



Gulf-weed (*Sargassum vulgare*).

Airdrie (ārdre), an industrial borough of Scotland (Falkirk district), in Lanarkshire, 11 miles east of Glasgow, in the center of a rich iron and coal mining district, with a large cotton-mill, foundries and machine shops, breweries, etc., and collieries and iron works in its vicinity. Pop. 22,288.

Air-engine, an engine in which air or compressed air is heated, and so expanded, or compressed air is used as the motive power. It may be said to be essentially similar in construction to the steam-engine, though the expansibility of air by heat is small compared with the expansion that takes place when water is converted into steam. Engines working by compressed air have been found very useful in mining, tunneling, etc., since the compressed air may be conveyed to its destination by means of pipes. In such cases the waste air serves for ventilation and for reducing the oppressive heat.

Aire-sur-l'Adour (ār-sur-lā-dōr), a small but ancient town of France, department of Landes, the see of a bishop. Pop. (1906) 2283.

Aire-sur-la-Lys (ār-sur-lā-lē), an old fortified town of France, department of Pas de Calais, 10 miles southeast of St. Omer. Pop. 4258.

Air-gun, an instrument for the projection of bullets by means of compressed air. It is generally either in the form of an ordinary gun or of a stout walking-stick, and about the same length. A quantity of air being compressed into the air-chamber by means of a condensing syringe, the bullet is put in its place in front of this chamber, and is propelled by the expansive force of the compressed air, which is liberated on pressing the trigger. See *Pneumatic-gun*.

Airolo (ā-i-rō'lo), a small town of Switzerland, canton Ticino, at the southern end of the St. Gothard Tun-

nel, and the first place on this route at which Italian is spoken. Pop. 1,600.

Air-plants, or **EPHYPHYTES**, are plants that grow upon other plants or trees, apparently without receiving any nutriment otherwise than from the air. The name is restricted to flowering plants (mosses or lichens being excluded) and is suitably applied to many species of orchids. The conditions necessary to the growth of such plants are excessive heat and moisture, and hence their chief localities are the damp and shady tropical forests of Africa, Asia, and America. They are particularly abundant in Java and tropical America.

Air-pump, an apparatus by means of which air or other gas may be removed from an enclosed space or for compressing air within an enclosed space. An ordinary suction-pump for water is on the same principle as the air-pump; indeed, before water reaches the top of the pipe the air has been pumped out by the same machinery which pumps the water. An ordinary suction-pump consists essentially of a cylinder or barrel, having a valve opening from the pipe through which water is to rise and a valve opening into the outlet pipe, and a piston fitted to work in the cylinder (the outlet valve may be in the piston). (See *Pump*.) The arrangement of parts in an air-pump is quite similar. The barrel of an air-pump fills with the air which expands from the receiver (that is, the vessel from which the air is being pumped), and consequently the quantity of air expelled at each stroke is less as the exhaustion proceeds, the air getting more and more rarefied. Fig. 1 represents the essential parts of a good air-pump in section. *R* is the receiver, *P* is a mercurial

sufficient to lift a valve, this valve is opened by means of the rod which passes up through the piston. The outlet valve is kept down by a light spiral spring; it opens when, on the space diminishing in the barrel by the descent of the piston, the contained air has a sufficient pressure. Fig. 2 shows a similar pump in perspective.

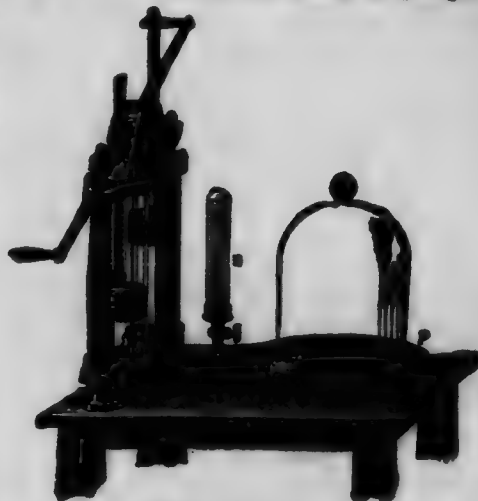


Fig. 2.—Air-pump.

tive (a double-barreled pump); *P* is the plate on which the receiver is placed, *R* the pressure-gauge, *E* the readmission cock. The pressure-gauge is merely a siphon barometer enclosed in a bell-shaped vessel of glass communicating with the receiver. This barometer consists of a bent tube containing mercury, one end being closed, the other open. As the air is exhausted the smaller is the difference between the height of the mercury in the two branches of the tube, and a complete vacuum would be indicated if the mercury stood at the same level in both. Air-pumps for compressing air are constructed on the same principle but act in the reverse way. Many interesting experiments may be made with the air-pump. If an animal is placed beneath the receiver, and the air exhausted, it dies almost immediately; a lighted candle under the exhausted receiver immediately goes out. Air is thus shown to be necessary to animal life and to combustion. A bell, suspended from a silken thread beneath the exhausted receiver, on being struck cannot be heard. If the bell be in one receiver from which the air is not exhausted, but which is within an exhausted receiver, it still cannot be heard. Air is therefore proved to be necessary to the production and to the transmission of sound. A shriveled apple placed be-

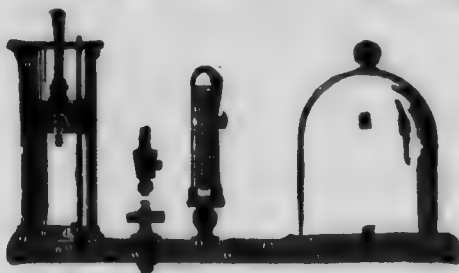


Fig. 1.—Air-pump (section view).

pressure-gauge, which indicates the extent of exhaustion; *n* is a cock by means of which air may be readmitted to the receiver or by means of which the receiver may be shut off from the pump-barrel. *S'* is the inlet valve of the barrel; and, inasmuch as the tension of the air in the receiver after some strokes would not be

neath an exhausted receiver becomes as plump as if quite fresh. The air-pump was invented by Otto von Guericke, burgomaster of Magdeburg, about the year 1654.

Air-ship. See *Aëronautics*.

Airy (ā're), SIR GEORGE BIDDELL, a distinguished English astronomer, was born at Alnwick, June 27, 1801, and educated at Trinity College, Cambridge, where he was senior wrangler in 1823. At Cambridge he was Lucasian professor of mathematics, and subsequently Plumian professor of astronomy and experimental philosophy, in the latter capacity having charge of the observatory. In 1835 he was appointed astronomer royal, and as such his superintendence of the observatory at Greenwich was able and successful. He resigned this post with a pension in 1881. He wrote largely and made numerous valuable investigations on subjects connected with astronomy, physics, and mathematics; and received many honors from academic and learned bodies. Among separate works published by him may be mentioned *Popular Astronomy*, *On Sound and Atmospheric Vibrations*, *A Treatise on Magnetism*, *On the Undulatory Theory of Optics*, and *On Gravitation*. Died in 1892.

Aisle (īl; from L. *ala*, a wing). In architecture, one of the lateral divisions of a church in the direction of its length, separated from the central portion or nave by piers or pillars. There may be one aisle or more on each side of the nave. The cathedrals at Antwerp and Paris have seven aisles in all. The nave is sometimes called the central aisle. See *Cathedral*.

Aisne (ān), a northeastern frontier department of France; area, 2868 sq. miles. It is an undulating, well-cultivated, and well-wooded region, chiefly watered by the Oise in the north, its tributary the Aisne in the center, and the Marne in the south. It contains the important towns of St. Quentin, Laon (the capital), Soissons, and Château Thierry. Pop. (1906) 534,495.

Aivali (ī-va'le), or KIDONIA, a seaport of Asiatic Turkey, on the Gulf of Adramytti, 66 miles north by west of Smyrna, carrying on an extensive commerce in olive-oil, soap, cotton, etc. Pop. about 20,000.

Aix (āks or ās), a town of Southern France, department Bouches-du-Rhône, on the river Arc, the seat of an archbishop. It is well built, has an old cathedral and other interesting buildings, high-class educational institutions, library

(150,000 vols.), museum, etc.; manufactures of cotton, woollens, oil, soap, hats, flour, etc.; warm springs, now less visited than formerly. Aix was founded in 123 B.C. by the Roman consul Caius Sextius Calvinus, and from its mineral springs was called *Aquæ Sextiæ* (Sextian Waters). Between this town and Arles Marius gained his great victory over the Teutons, 102 B.C. In the middle ages the counts of Provence held their court here, to which the troubadours used to resort. Pop. (1906) 19,433.

Aix, or AIX-LES-BAINS (āks-lā-bān), a finely situated village of France, department of Savoie, 8 miles north of Chambéry, on the side of a fertile valley, with much-frequented hot springs known to the Romans by the name of *Aquæ Gratiaræ*, and with ruins of a Roman triumphal arch, and of a temple of Diana. Pop. 5,437.

Aix-la-Chapelle (āks-lā-shā-pel; Ger. *Aachen*), a city of Rhenish Prussia, 38 miles west by south of Cologne, pleasantly situated in a fine valley; the old city was formerly surrounded by ramparts, now converted into pleasant promenades. It is well built, and though an ancient town has now quite a modern appearance. The most important building is the cathedral, the oldest portion of which, often called the nave, was erected in the time of Charles the Great (Charlemagne) as the palace chapel about 796. It is in the Byzantine style, and consists of an octagon, surrounded by a sixteen-sided gallery and surmounted by a cupola, in the middle being the tomb of Charlemagne. Aix-la-Chapelle, with the adjoining Burtscheid, which may be considered a suburb, is a place of great commerce and manufacturing industry, the chief productions being woollen yarns and cloths, needles, machinery, cards (for the woollen manufacture), railway and other carriages, cigars, chemicals, silk goods, hosiery, glass, soap, etc. A considerable portion of its importance and prosperity arises from the influx of visitors to its springs and baths, there being a number of warm sulphur springs here, and several chalybeate springs, with ample accommodation for strangers. Aix-la-Chapelle was known to the Romans as *Aquisgranum*. It was the favorite residence of Charles the Great, who made it the capital of all his dominions north of the Alps, and who died here in 814. During the middle ages it was a free imperial city and very flourishing. From Louis the Pious in 813 to Ferdinand I in 1531, it was the crowning-place of the emperors and kings, and it was also the seat of numerous diets and

councils. Pop. 156,044. *Congress of Aix-la-Chapelle*, a congress held in 1818, by which the army of the allies in France was withdrawn after France had paid the contribution imposed at the peace of 1815, and independence restored to France.—A treaty of peace concluded at this city, May 2, 1668, as a result of the Triple Alliance, put an end to the war carried on against Spain by Louis XIV in 1667.—The second peace of Aix-la-Chapelle, October 18, 1748, terminated the Austrian war of succession.

Ajaccio (a-yách'ô), the capital of Corsica, on the southwest coast of the island, on a tongue of land projecting into the Gulf of Ajaccio, the birthplace of Napoleon and the seat of a bishop, with coral and sardine fisheries, and a considerable trade. Pop. 22,264.

Ajanta (a-jan'ta), a village and ravine of India, in the Nizam's dominions, 24 miles north of Asaye. The ravine, 4 miles N. W. of the village, is celebrated for its cave temples,



Pillar at Ajanta.

twenty-nine in number, excavated out of a wall of almost perpendicular rock about 250 feet high. They are all richly ornamented with sculpture, and covered with highly-finished paintings.

Ajax (â'júks) (Gr. *Aias*), the name of two Grecian chiefs who fought against Troy, the one being son of Oileus, the other son of Telamon. The latter was from Salamis, and sailed with twelve ships to Troy, where he is represented by Homer as the boldest and

handsomest of the Greeks, after Achilles. On the death of Achilles, when his arms, which Ajax claimed, were awarded to Ulysses, he became insane and killed himself. This is the subject of Sophocles's tragedy *Ajax*.

Ajmeer, **AJMIR**, or **AJMER**, (âj-mēr'), a British commissionership in India, Rajputana, divided into the two districts of Ajmeer and Mairwara; area, 2711 sq. miles. The soil is partly fertile, but there occur large barren sandy plains. Pop. 476,330.—**AJMER**, the capital, an ancient city, a favorite residence of the Mogul emperors, is 220 miles S. W. of Delhi, at the foot of Taragarh Hill (2853 feet), on which is a fort. It is surrounded by a wall, and possesses a government college, a mosque that forms one of the finest specimens of early Mohammedan architecture extant, and an old palace of Akbar, now the treasury; trade in cotton, sugar, salt, etc. Pop. 73,839.

Ajowan (a-jô-wan') (*Psychotria Ajowan*), an umbelliferous plant cultivated in India, Persia, and Egypt, the seeds of which are used in cookery and in medicine, having carminative properties.

Ajuga, a genus of plants. See *Bugle*.

Ajutage (aj'ô-tâj), a short tube of a tapering shape fitting into the side of a reservoir to regulate the discharge of the water. Also, the nozzle of a tube for regulating the discharge of water to form a jet d'eau.

Akabah (â'kâ-bâ), **GULF OF**, an arm of the Red Sea, on the east side of the Peninsula of Sinai, which separates it from the Gulf of Suez; nearly 100 miles long. The village of Akabah, at the northern extremity of the gulf, is supposed to be the *Esion-geber* of the Old Testament.

Akaroid (â'kâ-roid) **RESIN**, a resin obtained from some of the grass-trees of Australia, used in varnishes.

Ak'bar (that is, 'very great'), a Mogul emperor, the greatest Asiatic prince of modern times. He was born at Amerkote, in Sind, in 1542, succeeded his father, Humayun, at the age of thirteen, and governed first under the guardianship of his minister, Beyram, but took the chief power into his own hands in 1560. He fought with distinguished valor against his foreign foes and rebellious subjects, conquering all his enemies, and extending the limits of the empire further than they had ever been before, although on his accession they embraced only a small part of the former Mogul empire. His government was

remarkable for its mildness and tolerance towards all sects; he was indefatigable in his attention to the internal administration of his empire, and instituted inquiries into the population, character, and productions of each province. The result of his statistical labors, as well as a history of his reign, were collected by his minister, Abul Fazi, in a work called *Akbar-Namah* (Book of Akbar), the third part of which, entitled *Ayini-Akbari* (Institutes of Akbar), was published in an English translation at Calcutta (1783-86, three vols.), and reprinted in London. He died in 1605. His mausoleum at Secundra, near Agra, is a fine example of Mohammedan architecture.

Akenside (A'ken-sid), MANK, a poet and physician, born in 1721, at Newcastle-upon-Tyne; died in London in 1770. He was the son of a butcher, and was sent to the University of Edinburgh to qualify himself for the Presbyterian ministry, but chose the study of medicine instead. After three years' residence at Edinburgh he went to Leyden, and in 1744 became Doctor of Physic. In the same year he published the *Pleasures of Imagination*, which he is said to have written in Edinburgh. Having settled in London in 1748, he became a fellow of the Royal Society and was admitted into the College of Physicians. In 1759 he was appointed first assistant and afterwards head physician to St.



Mausoleum of the Emperor Akbar at Secundra.

Akee' (*Blighia sapida*), a tree of the nat. order Sapindaceæ, much esteemed for its fruit. The leaves are somewhat similar to those of the ash; the flowers are small and white, and produce in branched spikes. The fruit is lobed and ribbed, of a dull, orange color, and contains several large black seeds, embedded in a succulent and slightly bitter arillus of a pale-straw color, which is eaten when cooked. The akee is a native of Guinea, from whence it was carried to the West Indies by Captain Bligh in 1793.

A Kempis, THOMAS. See *Thomas à Kempis*.

Aken (A'ken), a Prussian town, province of Saxony, on the left bank of the Elbe, with manufactures of tobacco, cloth, beet-root sugar, leather, etc. Pop. 7365.

Thomas's hospital. In his later years he wrote little poetry, but published several medical essays and observations. The place of Akenside as a poet is not very high, though his somewhat cumbersome and cloudy *Pleasures of Imagination* was once considered one of the most pleasing didactic poems in our language.

Akermann (A-ker-män'), a seaport of Southern Russia, in Bessarabia, near the mouth of the Dniester, with a good port. The vicinity produces quantities of salt and also fine grapes, from which excellent wine is made. A treaty was signed here, Oct. 6, 1826, between Russia and the Porte, by which Moldavia, Wallachia, and Servia were released from all but nominal dependence on Turkey. Pop. 28,303.

Akhaltzik (A-Aal-tzik'), a town of Russia in Asia, in the

Ak-Hissar

Trans-Caucasian government of Tiflis, 97 miles west of Tiflis, with a citadel. It was taken by the Russians in 1828. Pop. 15,387.

Ak-Hissar (ak-his-sar') ('White Castle'), a town in Asiatic Turkey, 58 miles N. E. of Smyrna, occupying the site of the ancient Thyatira, relics of which city are here abundant. It was an important station on the Roman road from Pergamum to Laodicea, and was the seat of one of the Seven Churches' of Asia. Pop. 20,000.

Akhtyrka (ak-tir'ka), a cathedral town of southern Russia, gov. Kharkov, with a good trade and some manufactures. Pop. 25,985.

Akjerma (ak-yer-man'). Same as Akerman.

Ak'kas, a dwarfish race of Central Africa, dwelling in scattered settlements to the northwest of Lake Albert, about lat. 3° N., lon. 29° E. Their height averages about 4½ feet; they are of a brownish or coffee color; head large, jaws projecting (or prognathous), ears large, hands small. They are timid and suspicious, and live almost entirely by the chase, being exceedingly skilful with the bow and arrow. Both males and females join in the hunt and they are said to be very courageous, attacking the largest animals, adroitly setting traps for them and killing them with poisoned arrows. They are nomad peoples, living chiefly in the forests, where they build huts for themselves out of branches and leaves. They form a branch of the primitive pygmy negroid race found in many parts of Africa. The Akkas are now confined to the Belgian Congo for the most part.

Akmolinsk (ak-ma-lyensk'), a Russian province in Central Asia, largely consisting of steppes and wastes; the rivers are the Ishim and Sari-Su; and it contains the larger part of Lake Balkash. Area of 230,000 sq. m. Pop. 680,803.—**AKMOLINSK**, the capital, is a place of some importance for its caravan trade. Pop. 9,557.

Akola (ä-ko-lä), a town of India, in Berar, the residence of the commissioner of Berar, on the river Morna, 150 miles W. by S. of Nagpur. Pop. about 29,289.

Ak'ron, a city in Ohio, county seat of Summit co., about 35 miles south from Cleveland; is a large rubber manufacturing center. It has also large cereal mills and clay products plants and a variety of other factories. Akron is on the trunk lines of the Pennsylvania, Erie and Baltimore & Ohio railroads. Pop. (1914) 100,000.

Aksu (ak-sü') ('white water'), a town of Eastern or Chinese Turkestan, 800 miles from Kashgar, in the valley of the Aksu. It is an important center of trade between Russia, China, and Tartary, and has manufactures of cotton cloth, leather, and metal goods. Formerly the residence of the kings of Kashgar and Yarkand. Pop. 15,000-20,000.

Akyab (äk-yäb'), a seaport of Lower Burmah, capital of the province of Arracan, at the mouth of the river Kuladan or Akyab, of recent upgrowth, well built, possessing a good harbor, and carrying on an important trade, its chief exports being rice and petroleum. Pop. 35,680.

Alabama (al-a-bä'ma), one of the United States, bounded by Tennessee, Georgia, Florida, the Gulf of Mexico, and Mississippi; area, 51,998 square miles. The southern part, bordering on the Gulf of Mexico and Florida, is low and level, and wooded largely with pine, hence known as the 'pine-woods region,' the middle is hilly, with some tracts of level sand or prairies; the north is broken and mountainous. The State is intersected by the rivers Alabama, Tombigbee, Mobile, Coosa, Tallapoosa, Tennessee, etc., some of them navigable for several hundred miles. The soil is various, being in some places, particularly in the south, sandy and barren, but in most parts is fertile, especially in the river valleys and in the center, where there is a very fertile tract known as the 'cotton belt.' The climate in general is warm, and in the low-lying lands skirting the rivers is rather unhealthy. In the more elevated parts it is healthy and agreeable, the winters being mild and the summers tempered by breezes from the Gulf of Mexico. The staple production is cotton, especially in the middle and south, where rice and sugar are also grown; in the north corn is the principal crop. Alabama possesses extensive beds of iron ore, coal and limestone. The combined iron and steel industry, including blast furnaces and rolling mills and steel works, exceed in value of products any other industry. Lumber and timber products come next; then cotton goods, oil and cottonseed, coke. The many small streams and waterfalls afford excellent water power. The State sends ten representatives to Congress. Its principal towns are Montgomery, the seat of government; Birmingham, the chief seat of iron manufacture, and Mobile, the chief port. There is a State university at Tuscaloosa, the Alabama Polytechnic Institute at Auburn, and other educational institutions including the Tuskegee Normal Institute for the in-



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dustrial education of the colored race. Alabama became a State in 1819. Population 2,138,093.

Alabama, a river of the United States, in the State of Alabama, formed by the junction of the Coosa and the Tallapoosa. After a course of 312 miles it joins the Tombigbee and assumes the name of the Mobile.

Alabama, THE, a ship built at Birkenhead, England, to act as a privateer in the service of the Confederate States of North America during the Civil war. She was a wooden screw steamer with two engines of 350 horse-power each, 1040 tons burden, and carried eight 32-pounders. Before she was launched her destination was made known to the British government, but delay in ordering her detention permitted her escape, the order reaching Liverpool one day late. She received her armament and stores at the Azores, and entered on a destructive career, capturing and burning merchant vessels, till she was sunk in a fight with the Federal war steamer *Kearsarge*, off Cherbourg, 19th June, 1864.

Alabama Claims, The. As early as the winter of 1862 the United States government declared that they held themselves entitled at a suitable period to demand full compensation from Britain for the damages inflicted on American property by the *Alabama* and several other cruisers that had been built, supplied, or recruited in British ports or waters. After a long series of negotiations it was agreed to submit the final settlement of the question to a court of arbitration, consisting of representatives of Britain and the United States, and of three other members, appointed by the King of Italy, the President of Switzerland, and the Emperor of Brazil. This court met at Geneva, 15th December, 1871, and a claim for indirect damages to American commerce having been abandoned by the United States government, the decree was given in September, 1872, that Britain was liable to the United States in damages to the amount of \$15,500,000.

Alabaster (a-la-bas'ter), properly a massive form of gypsum, hydrous calcium sulphate. Another form exists as carbonate of lime. The latter is the alabaster of the ancients, generally speaking, and the former the alabaster of the present day. They are distinguished from each other by their relative hardness, modern alabaster being so soft that it can readily be scratched with the nail, while the ancient or Oriental alabaster resists such treatment. The finer kinds of modern alabaster are quarried in Italy,

where after treatment it is often sold for Carrara marble. Oriental alabaster, known also as onyx marble, or simply onyx, occurs as either a stalagmitic deposit or a kind of travertine, and is found in the United States, Mexico and northern Africa. The banded appearance of onyx is due to its deposition in successive layers from springs of calcareous waters.

Alac'taga (*Alactaga jaculus*), a rodent mammal, closely allied to the jerboa, but somewhat larger in size, with a still longer tail. Its range extends from the Crimea and the steppes of the Don across Central Asia to the Chinese frontier.

Alagoas (ä-lä-gō'äs), a maritime province of Brazil; area, 22,600 sq. miles; pop. about 600,000.—**ALAGOAS**, the former capital of the province, is situated on the north of Lake Manguaba, about 20 miles distant from Maceio, to which the seat of government was transferred in 1839. The population as given in a recent estimate is about 15,000.

Alais (ä-lä), a town of Southern France, department of Gard, 25 miles N. W. of Nîmes, with coal, iron, and lead mines, which are actively worked, and chalybeate springs, which have many visitors during the autumn months. Pop. (1906) 18,987.

Alajuela (ä-lä-ä'u-ä'lä), a city of Costa Rica, capital of a province of the same name, about 12 miles from San José. It is in the center of an important coffee district. Pop. 6000.

Ala-Kul, a lake in Russian Central Asia, near the border of Mongolia, in lat. 46° N. lon. 81° 40' E.; area 660 sq. m.

Alamanni. See *Alemanni*.

Alamanni (ä-lä-män'i), LUIGI, an Italian poet, of noble family, born at Florence in 1495. Suspected of conspiring against the life of Cardinal Giulio Medici, who then governed Florence in the name of Pope Leo X, he fled to Venice, and when the cardinal ascended the papal chair under the name of Clement VII he took refuge in France, where he henceforth lived, being employed by Francis I and Henry II in several important negotiations. He died in 1556.

Alameda (ä-lä-mä'dä), Alameda county, Cal., a suburban city, situated on the Bay of San Francisco about 8 miles from the city, with which it is connected by electric trains and ferry. It is celebrated for its fine bathing beaches and beautiful streets, parks and gardens. Pop. 26,000.

Alamo

Alamo (al'a-mō), a fort in Bexar county, Texas, which is celebrated for the resistance its occupants (140 Texans) made to a Mexican force of 4000 from 23d February to 6th March, 1836. At the latter date only six Texans remained alive, and on their surrendering they were slaughtered by the Mexicans.

Alamos, a town of Mexico, State of Sonora, well built, the capital of a mining district. Pop. about 6000.

Åland (o'land) Islands, a numerous group of islands and islets about eighty of which are inhabited, belonging to Russia, situated in the Baltic Sea, near the mouth of the Gulf of Finland; area, 468 square miles. The principal island, Åland, distant about 30 miles from the Swedish coast, is 18 miles long and about 14 broad. It has a harbor capable of containing the whole Russian fleet. The fortress of Bomarsund, here situated, was destroyed by an Anglo-French force in August, 1854. The inhabitants, who are of Swedish extraction, employ themselves mainly in fishing. The islands were ceded by Sweden to Russia in 1809. Pop. about 24,000.

Ala'ni, or **ALANS**, one of the warlike tribes which migrated from Asia westward at the time of the decline of the Roman empire. They are first met with in the region of the Caucasus, where Pompey fought with them. From this center they spread over the south of modern Russia to the confines of the Roman empire. About the middle of the fifth century they joined the Vandals, among whom they become lost to history.

Alarcon y Mendoza (ä-lar-kön' e mem-do'thä), **DON JUAN RUIZ DE**, one of the most distinguished dramatic poets of Spain, born in Mexico about the beginning of the seventeenth century. He went to Europe about 1622, and in 1628 he published a volume containing eight comedies, and in 1634 another containing twelve. One of them, called *La Verdad Sospechosa* (The Truth Suspected), furnished Cornelle with the groundwork and greater part of the substance of his *Menteur*. His *Tejador de Segovia* (Weaver of Segovia) and *Las Paredes Oyen* (Walls have Ears) are still performed on the Spanish stage. He died in 1639.

Alaric I (al'ar-ik), King of the Visigoths, was born about the middle of the fourth century, and is first mentioned in history in A.D. 394, when Theodosius the Great gave him the command of his Gothic auxiliaries. The dissensions between Arcadius and Honorius, the sons of Theodosius, inspired Alaric with the intention of attacking the

Roman empire. In 396 he ravaged Greece, from which he was driven by the Roman general Stilicho, but made a masterly retreat to Illyria, of which Arcadius, frightened at his successes, appointed him governor. In 400 he invaded Italy, but was defeated by Stilicho at Pollentia (403), and induced to transfer his services from Arcadius to Honorius on condition of receiving 4000 lbs. of gold. Honorius having failed to fulfil this condition, Alaric made a second invasion of Italy, during which he besieged Rome thrice. The first time (409) the city was saved by paying a heavy ransom; the second (409) it capitulated, and Honorius was deposed, but shortly afterwards restored. His sanction of a treacherous attack on the forces of Alaric brought about the third siege, and the city was taken 24th August, 410, and sacked for six days, Alaric, however, doing everything in his power to restrain the violence of his followers. He quitted Rome with the intention of reducing Sicily and Africa, but died at Cosenza in 410.

Alaric II, King of the Visigoths from 484 to 507 A.D. At the beginning of his reign the dominions of the Visigoths were at their greatest extent, embracing three-fourths of the modern Spain and all Western Gaul to the south of the Loire. His unwarlike character induced Clovis, King of the Franks, to invade the kingdom of the Visigoths. In a battle near Poitiers (507) Alaric was slain and his army completely defeated. The *Breviarium Alaricianum*, a code of laws derived exclusively from Roman sources, was compiled by a body of Roman jurists at the command of this King Alaric.

Alarm (a-lärm'), in military language a signal, given by beat of drum, bugle-call, or firing of a gun, to apprise a camp or garrison of a surprise intended or actually made by the enemy. A place, called the *alarm-post*, is generally appointed at which the troops are to assemble when an alarm is given.—*Alarm* is also the name given to several contrivances in which electricity is made use of, as a *fire-alarm*, by which intelligence is at once conveyed to the proper quarter when a fire breaks out; a *burglar-alarm*, an arrangement of wires and a battery in a house intended to set a bell or bells ringing should a burglar attempt to gain entrance. An *alarm-clock*, one which can be set so as to ring loudly at a certain hour to wake from sleep or excite attention.

Ala-Shehr (ä-lä-shär'; ancient *Philadelphia*), a town in Turkey in Asia, 76 miles east of Smyrna,

Ala-Shehr

famous as the seat of one of the first Christian churches, and still having a vast number of interesting remains of antiquity, consisting of fragments of beautiful columns, sarcophagi, fountains, etc. It is a place of some importance, carrying on a thriving trade by caravans, chiefly with Smyrna. Pop. about 22,000.

Alaska (a-las'ka), a territory belonging to the United States, comprising all that portion of the northwest of North America which lies west of the 141st meridian of west longitude, together with an irregular strip of coast land (and the adjacent islands), extending south to lat. 54° 40' N., and lying between the British territories and the Pacific; total area, about 577,390 sq. m. The territory is watered by several rivers, the principal of which is the Yukon, a river of about 2000 miles in total length; 1500-1600 miles within the territory. The principal mountains (among which are a number of active volcanic peaks) are Mounts McKinley (20,464 ft.), Wrangell, and Fairweather. The climate of the interior is very severe in winter; in summer the heat is intense; on the Pacific coast it is mild but moist. Alaska produces an abundance of excellent timber, and has proved capable of growing oats, rye, barley and some other garden and field products. Numbers of fur-bearing animals abound, such as the fur-seal, sea-otter, beaver, fox, mink, marten, etc.; and the fur trade has long been valuable. The coasts and rivers swarm with fish, and salmon, herring, halibut, and cod are caught and exported, the salmon fisheries being of great importance. Gold exists in many localities, especially near Nome and the Seward Peninsula, the annual product reaching about \$20,000,000. Very rich deposits of coal have been found, of excellent quality, and copper is abundant. The aboriginal inhabitants consist of Eskimos and Indians. Alaska formerly belonged to Russia, but was made over to the United States in 1867 for a sum of \$7,200,000. A long-pending Alaskan boundary dispute between Canada and the United States was settled in favor of the latter in 1903. The seat of government is Juneau on Gastineau Channel. In 1914, Congress authorized the construction of a Federal railway to the interior of Alaska, the total mileage not to exceed 1000 miles and the total cost \$35,000,000.

Alatau (a-lâ-tou'), the name of three considerable mountain ranges of Central Asia, on the Russian and Chinese frontiers.

Alatyr (â-lâ-tir'), a town in Simbirsk, Russia, at the confluence of the Alatyr with the Sura. Pop. 14,000.

Alauda (a-lâ'da), a genus of insectorial birds, which includes the larks.

See *Lark*.

Alava (â-la-vâ), a hilly province in the north of Spain, one of the three Basque provinces; area, 1207 sq. m.; covered by branches of the Pyrenees, the mountains being clothed with oak, chestnut and other timber, and the valleys yielding grain, vegetables, and abundance of fruits. There are iron and copper mines, and inexhaustible salt springs. Capital, Vitoria. Pop. 96,385.

Alb (from *L. albus*, white), a clerical vestment worn by priests while officiating in the more solemn functions of divine service. It is a long robe of white linen reaching to the feet, bound round the waist by a cincture, and fitting more closely to the body than the surplice.

Al'ba, the name of several towns in ancient Italy, the most celebrated of which was Alba Longa, a city of Latium; according to tradition, built by Ascanius, the son of Æneas, 300 years before the foundation of Rome; at one time the most powerful city of Latium. It ultimately fell under the dominion of Rome, when the town was destroyed, it is said. In later times its site became covered with villas of wealthy Romans.

Alba (anciently *Alba Pompeia*), a town of Northern Italy, about 30 miles S.E. of Turin, is the see of a bishop, has a cathedral, bishop's palace, church with fresco paintings by Perugino, etc. Pop. 13,900.

Alba, DUKE OF. See *Alva*.

Albacete (âl-bâ-thâ'tâ), a town in Southern Spain, capital of the province of the same name, 106 miles N. N. W. of Cartagena, with a considerable trade, both direct and transit, and manufactures of knives, daggers, etc. Pop. 21,512.—The province has an area of 5737 sq. miles, and a pop. of 237,877.

Alba Longa. See *Alba*.

Alban (âl'ban) SAINT, the traditional proto-martyr of Britain, who flourished in the third century, was, it is said, converted from paganism by a confessor whom he had saved from his



Alb.

persecutors, and refusing to sacrifice to the gods was executed outside of the city of Verulamium (St. Albans) in 285 or 305.

Albani, MADAME EMMA, the professional name of Marie Louise Emma Cecile Lajeunesse, a celebrated Canadian dramatic soprano, born at Chambly, near Montreal, in 1852. She studied at Paris and Milan and made her debut in *La Sonnambula* at Messina in 1870. She has sung in opera at New York, Berlin, Paris, and other cities in various parts of the world. She was honored by Orders of Merit from England, Denmark and Germany, besides two Jubilee medals and a Victoria Badge. In 1911 she published her *Forty Years of Song*.

Albani (al-ba'ne), FRANCESCO, a famous Italian painter, born at Bologna in 1578, died in 1660. He had as teachers the Flemish painter Calvaert and the Caracci. Among the best known of his compositions are the *Sleeping Venus*, *Diana in the Bath*, *Danaë Reclining*, *Galatea on the Sea*, *Europa on the Bull*.

Albania (al-ba'ne-a), nominally an independent principality extending along the western part of the Balkan peninsula from the southern frontier of Montenegro to the northern boundary of Greece. The boundary in the east is formed by a range of mountains and the country is composed of at least nine ridges of hills, of which six are in Lower or Southern Albania (ancient Epirus) and the remainder in Central and Upper Albania. There are no large rivers, and in summer many of the streams are completely dry. The Drin is the largest. Ochrida and Scutari are the principal lakes. Among trees Albania has many species of oak, poplar, hazel, cypress and laurel. The vine flourishes, together with the orange, almond, fig, mulberry, and citron. Chief exports are live stock, wool, hides, timber and oil. The principal towns are Scutari, Prevesa, Avlona, and Durazzo.

The population of Albania proper is less than 1,000,000, but within the broader limits of the Albanian country there are about 2,000,000 souls, of whom 250,000 are Serbs. Most of them are Mohammedans. Apparently the Albanians are the most ancient race in southeastern Europe. They have managed to maintain a measure of independence from earliest times. In the Middle Ages they offered resistance to the Greeks and subsequently to the Turks. Their most famous warrior was Scanderbeg (George Castriota), who fought thirteen campaigns from 1444 to 1466 and overwhelmed great armies of

the Ottoman empire. (See *Scanderbeg*.) On his death the Venetians came to the aid of the Albanians, but they, with their Montenegrin allies, were defeated, and from 1571 the nominal authority of the Porte was acknowledged, but never effectively established, succeeding centuries presenting a record of conflicts between the tribesmen and the Turks and between the various religious sects. In 1807 Ali Pasha, of Tepelen, established a practical sovereignty over Albania. He made Jannina his capital and introduced a measure of civilization. He was known as the Lion of Jannina; an able but a cruel and unscrupulous man. He renounced allegiance to the sultan, but was overthrown in 1822. In 1878 an attempt was made to transfer Albanian territory to Austria-Hungary, Serbia and Montenegro, but the Albanian leaders displayed such a spirit of militant independence that the scheme was dropped. In 1880 the powers decreed that Greece should profit at Albania's expense, but the southern Albanians united to resist the territorial cessions.

The Balkan war has been attributed to this spirit of independence which in 1911 culminated in the revolt of the Malissori tribe against the Turks. Bulgaria, Serbia, Montenegro and Greece attacked Turkey (see *Balkan War*) and when peace was signed May 30, 1913, Turkey agreed to give up large stretches of country, and her overlordship of Albania ceased. The new principality of Albania came into being in October, 1913, at an international council consisting of representatives of Great Britain, Germany, Russia, France, Austria-Hungary, and Italy. Prince William of Wied, a German subject and a relation of Queen Elizabeth of Rumania, was nominated as first prince of the autonomous principality—Mpret of Albania, as he was styled.

At the beginning of the European war (q. v.) the Mpret was menaced by an uprising in the municipality and in July, 1914, had appealed to the powers for help. Help might have been forthcoming, but the outbreak of the great war absorbed the thought of the powers, and the German princeling, Mpret of Albania, sailed from Durazzo for Italy, leaving the country to its own resources. An attempt was made to place the son of the former Sultan, Abdul Hamid, on the vacant throne, but Essad Pasha, who had been Minister of War, assumed control and gathered about him an army of 10,000 and had himself appointed President of the provisional government. A revolution overthrew Essad Pasha, and Italy and Greece took a hand in the affairs of the country.

In October Italian forces occupied Avlona, and a little later Greece occupied several districts in Epirus. In 1915 the Serbians established themselves in Albania, after retreating before the Teutonic and Bulgarian armies, and planned to set up a military base there. The Austro-Bulgarian forces occupied Durazzo in February, 1916. Two declarations by foreign powers, declaring the autonomy of Albania, under their respective protection, came in 1917: one by Austria-Hungary in January, and the second by Italy in June. France was reported to have occupied towns in Albania, which apparently becomes a prize of war unless the powers agree on autonomy under international control.

Albany, capital of New York State and an important railroad and commercial city, on the west bank of the Hudson, 145 miles north of New York City, with which it has direct steamboat communication by day and night lines. The Erie and Champlain Canals and the numerous railroad lines, West Shore, New York Central, and Delaware and Hudson, centering here from all directions greatly contribute to the growth and prosperity of the city, which carries on a large trade in iron, wood and brass manufacture, printing and engraving, collar and cuff manufacture, and clothing.

Albany was settled by the Dutch in 1610-14, and the older houses are in the Dutch style, with the gable ends to the street. The old Van Rensselaer manor house, which was built in 1765, is now on the campus of Williams College at Williamstown, Mass. The old Schuyler house is used as a museum. It was at Albany that the first general Congress of the colonies was held, on which occasion plans were made for the union. (See *Albany Convention*.) The most striking building in Albany is the Capitol, built in 1871 at a cost of \$24,000,000. It is built of Maine granite, in the Renaissance style, and is ranked among the noteworthy edifices of the country. Other notable buildings are the State Education building, the State Hall for the public offices, the Geological and Agricultural Hall, the Union Station, the Hotel Ten Eyck, the Albany Academy, the State Armory, the Cathedral of the Immaculate Conception, with its twin spires, the Cathedral of All Saints, the North Dutch Church and St. Peter's Church. Population, 100,253. (See *New York*.)

Albany, a city and the county seat of Willamette River, 86 miles southwest of Portland. It is in the center of the lumber country and in addition to numerous

sawmills it has an extensive trade in grain, flour, sandstone, and fruits. Power is furnished by the Willamette River. Among the principal buildings are Albany College, a Presbyterian institution, opened in 1867, the Carnegie Library, Albany Academy, and a number of fine churches. The population in 1913 was about 7500.

Albany, or ALBION, the ancient name of Britain among its Celtic population and retained by the Celts to designate the northern part of the island when they congregated in Scotland. Prince Charles Stuart was known as the Count of Albany and gave the title of Duchess of Albany to his daughter.

Albany, a river in the province of Ontario, Canada. It rises in Lake St. Joseph and flows into James Bay at Fort Albany. It separates Ontario from Keewatin.

Albany, a seaport in the Commonwealth of Australia, and a popular health resort. It is in Plantagenet county, Western Australia, and is a port of call for steamers taking the Cape Route, the harbor being one of the finest in the state. Population about 4000.

Albany, a city, county seat of Dougherty county, Georgia, on Flint River, 107 miles s. s. w. of Macon. It is an important railroad terminal, ships cotton by water, being at the head of navigation, and has several manufacturing industries. It has become a health resort. Pop. 8190.

Albany, LOUISA MARIA CAROLINE, COUNTESS OF, a princess of the Stolberg-Gedern family, was born in 1753, and married, in 1772, the Pretender, Charles Edward Stuart, after which event she bore the above title. To escape from the ill-treatment of her husband she retired, in 1780, to the house of her brother-in-law at Rome, where she met the poet Alfieri, whose mistress she became. (See *Alfieri*.) She died at Florence in 1824.

Albany Convention, an assembly of the representatives of the seven northern British-American Colonies (Massachusetts, Connecticut, Rhode Island, New Hampshire, New York, Pennsylvania and Maryland), called together in 1754 at Albany, New York, to discuss a plan of intercolonial union. The plan as presented was never approved either by the Colonies or by the Crown, as it was regarded by the former as giving too much power to the Crown, and by the latter as giving too much power to the Colonies.

Albany Regency. In American political history the name applied to a group of Democratic leaders in New York State, who held con-

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Albatross

trol of the party machinery there, 1820-54, and exerted a powerful influence throughout the state and nation. The organization was distinguished by the ability of its leaders and by the exploitation of the 'spoils system.' Among them were Martin Van Buren, John A. Dix and Benjamin F. Butler.

Albatross (al'ba-tros), a large marine swimming bird of several species, of which the wandering albatross (*Diomedea exulans*) is the best known. The bill is straight and strong, the upper mandible hooked at the point and the lower one truncated; there are three webbed toes on each foot. The upper part of the body is of a grayish brown, and the belly white. It is the largest sea-bird known, some measuring 17½ feet from tip to tip of their expanded wings. They abound at the Cape of Good Hope and in other parts of the southern seas, and in Behring Straits, and have been known to accompany ships for whole days without ever resting on the waves. From this habit the bird is regarded with feel-



Albatross

ings of attachment and superstitious awe by sailors, it being reckoned unlucky to kill one. Coleridge has availed himself of this feeling in his *Ancient Mariner*. The albatross is met with at great distances from the land, settling down on the waves at night to sleep. It is exceedingly voracious whenever food is abundant, gorging to such a degree as to be unable to fly or swim. It feeds on fish, carrion, fish-spawn, oceanic mollusca, and other small marine animals. Its voice is a harsh, disagreeable cry. Its nest is a heap of earth; its eggs are larger than those of a goose.

Albay (al-bi'), a province, town, bay, and volcano in the southeast part of the island of Luzon, one of the Philippines. The province is mountainous but fertile; the town regularly built, with a population of 14,049, the bay capacious, secure, and almost landlocked; and the volcano, which is always in activity, forms a conspicuous landmark. The province Albay is noted as being the richest hemp-growing district on the island. The town Albay is the chief port.

Albert

Albemarle, DUKE OF. See *Monk, George*.

Albemarle, a Confederate iron-clad ram. She did much damage to Union steamers during the spring of 1864, but was destroyed by Lieut. W. B. Cushing during the night of October 27 of that year. She was torpedoed from a small launch commanded by Cushing.

Alberoni, CARDINAL GIULIO (jū'li-o al-bā-rō'nē), born in 1664 in north Italy, and educated for the church. The Duke of Parma sent him as his minister to Madrid, where he gained the affection of Philip V. He rose by cunning and intrigue to the station of prime minister, became a cardinal, was all powerful in Spain after the year 1715, and endeavored to restore it to its ancient splendor. In pursuance of this object he invaded Sardinia and Sicily, and indeed entertained the idea of stirring up a general war in Europe. The alliance of France and England, however, rendered his schemes abortive, and led to his dismissal and exile in 1720. He wandered about a long time under false names and using many disguises and was for a time at liberty to continue his plotting. At the earnest request of the Pope and the Spanish monarch, however, he was arrested and imprisoned in the Genoese territory. Shortly afterward he was released, and two years after the death of Pope Clement and the accession of Innocent XIII he was restored to all the rights and honors of a cardinal. He died on June 26, 1752, at Piacenza on the river Po, where he had lived in retirement for twelve years, from 1740. He founded at Piacenza the Collegio Alberoni, a college for the education of poor boys for the priesthood.

Albert (al'bar'), a town in Picardy, France, the center of terrific fighting during the European war. It was captured by the Germans, but was retaken by the British and Canadian forces in the famous 'spring drive of 1917,' which forced the German line back for 20 miles. It was for over a year the concentration point of the British headquarters. In March, 1918, Albert once more changed hands, the German hordes released from Russia sweeping across the country, bringing devastation after attempted rehabilitation. Hardly a square mile of blood-drenched Flanders was so crowded with tragic surprises as the environs, for a space of twenty miles, of this little town on the Ancre, a stream made famous by the succession of battles fought there. Albert was once known as Ancre, and was the seat of the marquise of Ancre.

Albert I, King of the Belgians (1875-), nephew of Leopold II, whom he succeeded in 1909. He visited the United States in 1898; and with Queen Elizabeth and Prince Leopold, Duke of Brabant, heir apparent, made a second visit in 1919, following the European war (q. v.), in which he played a heroic part.

Albert I, Duke of Austria and afterwards Emperor of Germany, son of Rodolph of Hapsburg, was born in 1248. On the death of his father in 1292 he claimed the empire, but his arrogant conduct drove the electors to choose Adolphus of Nassau emperor. Adolphus, after a reign of six years, having lost the regard of all the princes of the empire, Albert was elected to succeed him. A battle ensued near Gellheim, in which Adolphus fell by the hand of his adversary, who was elected and crowned. He was assassinated at Windisch in May, 1308, by his nephew John, Duke of Suabia.

Albert, first Duke of Prussia, and last grand-master of the Teutonic Order, was born in 1490; died in 1568. In 1511 he was chosen by the Teutonic knights grand-master of their order. Being nephew of Sigismund, King of Poland, the knights hoped by his means to be freed from the feudal superiority of Poland, and placed under the protection of the empire. This superiority, however, Sigismund refused to surrender, and war broke out between uncle and nephew. He subsequently became reconciled to his uncle, abandoned the vows of his order, became a Protestant, and obtained his investiture as hereditary duke of Prussia under the Polish crown, the territorial rights of the Teutonic Order being thus set aside. The latter years of his reign were spent in organizing the government and promoting the prosperity of his duchy; he founded schools and churches, established a ducal library, and opened the University of Königsberg in 1543.

Albert, PRINCE, Albert Francis Augustus Charles Emmanuel, Prince of Saxe-Coburg-Gotha, second son of Ernest I, Duke of Saxe-Coburg, was born 26th August, 1819. In 1837 he entered the University of Bonn, and on Feb. 10, 1840, was married to his cousin, Queen Victoria of England. He received the title of Royal Highness by patent, was made a field-marshal, a Knight of the Garter, of the Bath, etc. Other honors were subsequently bestowed upon him, the chief of which was the title of Prince Consort (1857). He carefully abstained from party politics, but never ceased to take a deep and active interest in the welfare of the people in general. He presided and delivered the inaugural address

at the meeting of the British Association at Aberdeen in 1859. He died of typhoid fever on December 14, 1861, after a short illness. A biography of the prince by Sir Theodore Martin has been published in five volumes, London, 1875-80.

Alberta (al-ber'ta), until the year 1905 one of the Northwest Territories of Canada, was then made a province of the Dominion and its area much increased, embracing the western half of the former territory of Athabasca and strips of Saskatchewan and Assiniboia. Topographic and climatic conditions divide the territory into a southern and a northern region. South Alberta is a ranching and dairying country; North Alberta is an agricultural district, producing grain, vegetable and root crops. The country is watered by the Smoky, Athabasca, North Saskatchewan, Battle, Red Deer, Bow, Belly and Milk rivers. The coal resources are very great and their extensive development is only a question of time. Pop. 374,663.

Albert Edward Nyanza, a lake of Africa, 110 miles w. of Victoria Nyanza, and 100 miles s. by w. of Albert Nyanza. It is about 40 miles in both length and breadth and is connected with the Albert Nyanza by the Semliki river. Elevation 2870 feet; discovered by Stanley in 1875.

Albert Lea, a city, capital of Freeborn Co., Minnesota, on Albert Lea and Fountain lakes, 108 miles s. of Minneapolis. It has various schools and colleges, including Albert Lea College for women. Here are a large packing plant, gas-lighting machine factories, a co-operative creamery operated by the State, etc. Pop. 6192.

Albert Nyanza (nl-an'za), a lake of Africa, one of the feeders of the Nile, lying (approximately) between lat. 2° 30' and 1° 10' N., and with its northeast extremity in about lon 28° E.; general direction from northeast to southwest; surface about 2200 feet above sea level.

Albertite (al'ber-tit), a variety of asphalt occurring in sub-carboniferous rocks in Albert Co., N. B., Ohio, Kentucky and West Virginia.

Albertus (äl-ber'tus) MAGNUS, or ALBERT THE GREAT, Count of Bollstädt, a distinguished German scholar of the thirteenth century, born in 1193, studied at Padua, became a monk of the Dominican order, teaching in the schools of Hildesheim, Ratisbon, and Cologne, where Thomas Aquinas became his pupil. In 1245 he went to Paris and publicly expounded the doctrines of Aristotle, notwithstanding the prohibition

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of the church. He became rector of the school of Cologne in 1249; in 1254 he was made provincial of his order in Germany; and in 1260 he received from Pope Alexander IV the appointment of Bishop of Ratisbon. In 1263 he retired to his convent at Cologne, where he composed many works, especially commentaries on Aristotle. He died in 1280. Owing to his profound knowledge he did not escape the imputation of using magical arts and trafficking with the Evil One.

Al'bi. See *Alby*.

Albigenses (al-bi-jen'sēz), a sect which spread widely in the south of France and elsewhere about the twelfth century, and which rejected Scripture, infant baptism, marriage, churches, priesthood, and the mass, and admitted the equality of good and evil. They are said to have been so named from the district of Albi, where, and about Toulouse, Narbonne, etc., they were numerous. A crusade was begun in 1209 against them and against Count Raymond VI of Toulouse for exploiting them. This crusade, political rather than religious, was very cruelly waged to bring Languedoc into submission to the crown of France. Béziers, the capital of Raymond's nephew Roger, was taken by storm, and 20,000 of the inhabitants, without distinction of creed, were put to the sword. Simon de Montfort, the military leader of the crusade, was equally severe towards other places in the territory of Raymond and his allies. After the death of Raymond VI, in 1222, his son, Raymond VII, was obliged, notwithstanding his readiness to do penance, to defend his inheritance against the papal legates and Louis VIII of France. When very many thousands had fallen on both sides, a peace was made in 1229, by which Raymond was obliged to cede Narbonne with other territories to Louis IX, and make his son-in-law, a brother of Louis, his heir. The heretics were now delivered up to the proselytizing Dominicans, and to the inquisition, and they disappeared after the middle of the thirteenth century.

Albina (al-bē'na), formerly a city of Multnomah Co., Oregon, now a part of Portland.

Albinos (al-bi'nōz), the name given to those persons from whose skin, hair and eyes, in consequence of some defect in physiological activity, the dark coloring matter is absent. The skin of albinos, therefore, whether they belong to the white, Indian, or negro races, is of a uniform pale milky color, their hair is white, while the irides of their eyes are pale-rose color, and the pupil intensely

red, the absence of the dark pigment allowing the multitude of blood-vessels in these parts of the eye to be seen. For the same reason their eyes are not well suited to endure the bright light of day, and they see best in shade or by moonlight. The peculiarity of *albinism* or *leucopathy* is always born with the individual, and is not confined to the human race, having been observed also in horses, rabbits, rats, mice, etc., birds (white crows or white blackbirds are not particularly uncommon), and fishes.

Albion (al'bi-on) (Celtic *Albainn*, probably connected with *L. albus*, white), the earliest name by which the island of Great Britain was known, employed by Pliny, and in poetry still used for Great Britain. The same word as *Albany*, *Albyn*.

Albion, a city of Calhoun Co., Michigan, on the Kalamazoo River, 30 miles s. s. w. of Lansing. It has manufactures of iron, harness, farming utensils, windmills, etc. Pop. 5,833.

Albion, a village, capital of Orleans Co., New York, on the Erie Canal, 30 miles w. of Rochester. It has extensive stone-quarries and canning factories. Here is situated the Western House of Refuge for Women. Pop. 5,016.

Albite (al'bit) or **SODA-FELSPAR**, a mineral, a kind of felspar, usually of a white color, to which property it owes its name (*L. albus*, white), but occasionally bluish, grayish, greenish, or reddish white.

Alboin (al'boin), King of the Lombards, succeeded his father Audoin in 561, and reigned in Noricum and Pannonia. Narses, the general of Justinian, sought his alliance, and received his aid, in the war against Totila, king of the Ostrogoths. Alboin afterwards (in 568) undertook the conquest of Italy, where Narses, who had subjected this country to Justinian, offended by an ungrateful court, sought an avenger in Alboin, and offered him his co-operation. After a victorious career in Italy he was slain at Verona, in 573 or 574, by an assassin, instigated by his wife Rosamond, whose hatred he had incurred by sending her, in one of his fits of intoxication, a cup wrought from the skull of her father, and forcing her to drink from it.

Albrecht (al'brecht), the German form of *Albert* (which see).

Albrechtsberger (al'brechts-ber-ger), JOHANN GEORG, a German composer and writer on music; a teacher of Beethoven, Moscheles, etc. Born 1736, died 1809.

Albret, D' JEANNE (shān dāi-brā), Queen of Navarre, wife of

Antoine de Bourbon and mother of Henri IV of France, a zealous supporter of the reformed religion, which she established in her kingdom; born 1528, died (probably poisoned), 1572, shortly before the massacre of St. Bartholomew.

Albronz, an alloy of aluminum and copper, of very durable character, used for telescope bearings, etc.

Albuera (ál-bu-á-rá), a village of Spain, in Estremadura, 12 miles S. S. E. of Badajoz. A battle was fought here, May 16, 1811, between the army of Marshal Beresford (30,000) and that of Marshal Soult (25,000), when the latter was obliged to retreat to Seville, leaving Badajoz to fall into the hands of the allies. Pop. 800.

Albugo (ál-bú'gō) an affection of the eye, consisting of a white opacity in the cornea; called also *leucoma*.

Album, a name now generally given to a blank book for the reception of pieces of poetry, autographs, engravings, photographs, post cards, etc.

Albumen (ál-bū'men), or **ALBUMIN** (L. from *albus*, white), a substance, or rather group of substances, so named from the Latin for the white of an egg, which is one of its most abundant known forms. It may be taken as the type of the protein compounds or the nitrogenous class of foodstuffs. One variety enters largely into the composition of the animal fluids and solids, is coagulable by heat at and above 160°, and is composed of carbon, hydrogen, nitrogen, and oxygen, with a little sulphur. It abounds in the serum of the blood, the vitreous and crystalline humors of the eye, the fluid of dropsy, the substance called coagulable lymph, in nutritive matters, the juice of flesh, etc. The blood contains about 7 per cent of albumen. Another variety, called vegetable albumen, exists in most vegetable juices and many seeds, and has nearly the same composition and properties as egg albumen. When albumen coagulates in any fluid it readily encloses any substance that may be suspended in the fluid. Hence it is used to clarify syrupy liquors. In cookery white of eggs is employed for clarifying, but in large operations like sugar-refining the serum of blood is used. From its being coagulable by various salts, and especially by corrosive sublimate, with which it forms an insoluble compound, white of egg is a convenient antidote in cases of poisoning by that substance. With lime it forms a cement to mend broken ware.

In botany the name albumen is given to the farinaceous matter which surrounds the embryo, the term in this case

having no reference to chemical composition. It constitutes the meat of the cocoanut, the flour or meal of cereals, the roasted part of coffee, etc.

Albumenuria (ál-bū-me-nū'ri-a), or **ALBUMINURIA**, a condition in which the urine contains albumen, evidencing a diseased state of the kidneys.

Albunol (ál-bu-nyol'), a seaport of southern Spain, prov. Granada, on the Mediterranean. Pop. 8500.

Albuquerque (ál-bū-kerk'a), **ALFONSO DE**, an eminent Portuguese admiral, born 1452, died in 1515. Portugal having subjected to its power a large part of the western coast of Africa, and begun to extend its sway in the East Indies, Albuquerque was appointed viceroy of the Portuguese acquisitions in this quarter, and arrived in 1503 with a fleet on the coast of Malabar. His career here was extremely successful, he having extended the Portuguese power over Malabar, Ceylon, the Sunda Islands, and the Peninsula of Malacca, and made the Portuguese name respected.

Albuquerque, the county seat of Bernalillo county, New Mexico, on the Rio Grand, 56 miles southwest of Santa Fé, on the Atchison, Topeka and Santa Fé and Santa Fé Pacific railroads, is the largest distributing center of the state. Pop. 11,020.

Alburnum (ál-bur'num), the soft white substance which, in trees, is found between the inner bark and the wood, and in progress of time acquiring solidity, becomes itself the wood. A new layer of wood, or rather of alburnum, is added annually to the tree in every part just under the bark. Alburnum, or *sapwood* as it is called by timber merchants, consists of little but vegetable tissue, and is much less durable than heartwood, or *duramen*, vegetable tissue combined with solid secretions.

Albury (ál'ber-i), a town of New South Wales, Australia, on the right bank of the Murray river, which separates it from Victoria. It is 190 miles northeast of Melbourne, 386 miles from Sydney, in a good agricultural and wine-producing district. Pop. in 1911, 6300.

Alby, or **ALBI** (ál'bē) an old town of southern France, department of Tarn, 42 miles northeast of Toulouse, on the Tarn, in an extensive plain. It has a cathedral, a Gothic structure, begun in 1882; and manufactures of linens, cottons, leather, etc. Alby is said to have given the Albigenses their name. Pop. 14,951.

Alceus (al-sē'us), one of the greatest Grecian lyric poets, was born at Mitylene, in Lesbos, and flourished there at the close of the seventh and beginning of the sixth centuries B.C.; but of his life little is known. A strong, manly enthusiasm for freedom and justice pervades his lyrics, of which only a few fragments are left. He wrote in the Æolic dialect, and was the inventor of a metre that bears his name, which Horace has employed in many of his odes.

Alcalá de Guadaira (al-ka-la' de gwa-dí'ra; 'the Castle of Guadaira'), a town of Southern Spain, on the Guadaira, 7 miles east of Seville, chiefly celebrated for its manufacture of bread, with which it supplies a large part of the population of Seville. Pop. about 8,000.

Alcalá de Henares (en-á'res), a beautiful city of Spain, 16 miles E.N.E. of Madrid, 1 mile from the Henares. It has an imposing appearance when seen from some distance, but on nearer inspection is found to be in a state of decay. There was formerly a university here, at one time attended by 10,000 students, but in 1836 it was removed with its library to Madrid. Cervantes was born here. Pop. 11,206.

Alcalá la Real (rá-ál'), a town of Spain, 18 miles s. w. of Jaen, with a fine abbey and some trade. It was captured in 1340 by Alphonso XI of Leon, from whence it derives the epithet Real ('Royal'). Pop. 15,973.

Alcalde (Spanish; ál-kál'dá), or **ALCAIDE** (Portuguese; ál-kí'dá; Arabic *alqadī*, the judge), the name of a magistrate in the Spanish and Portuguese towns, to whom the administration of justice and the regulation of the police is committed. His office nearly corresponds to that of justice of the peace. The name and the office are of Moorish origin.

Alcamo (ál'ká-mo), a city in the west of Sicily, 2½ miles south of the Gulf of Castellamare, near the site of the ancient Segesta, the ruins of which, including a well-preserved Doric temple and a theater as well as the remains of Moorish occupation, are still to be found here. The district is celebrated for its wine. Pop. 51,809.

Alcañiz (ál-kán-yeth'), a town of Northeastern Spain (Aragon). Pop. 7,806.

Alcantara (ál-kán'tá-rá) (Arabic, the bridge) an ancient town and frontier fortress of Spain, on the Tagus, on a rocky acclivity, and in-

closed by ancient walls. Pop. about 8000. **Order of Alcantara**, an ancient Spanish order of knighthood instituted for defense against the Moors in 1156, and made a military religious order in 1177.

Alcarraza (ál-kár-rá'thā), a vessel made of a kind of porous, unglazed pottery, used in Spain to hold drinking water, which, oozing slightly through the vessel, is kept cool by the evaporation that takes place at the surface. Similar vessels have been long used in Egypt and elsewhere.

Alcázar de San Juan (ál-l-ká'thár dá sán-juán), a town of Spain, province of Ciudad-Real (New Castle), with manufactures of soap, saltpetre, gunpowder, chocolate, etc. Pop. 11,490.

Alce'do. See *Kingfisher*.

Alcestis (al-sēs'tis), in Greek mythology, wife of Admetus, King of Thessaly. Her husband was ill, and, according to an oracle, would die unless some one make a vow to meet death in his stead. This was secretly done by Alcestis, and Admetus recovered. After her decease Hercules brought her back from the infernal regions.

Alchemy, or **ALCHYMY** (al'ke-mí), the art which in former times occupied the place of and paved the way for the modern science of chemistry (as astrology did for astronomy), but whose aims were not scientific, being confined solely to the discovery of the means of indefinitely prolonging human life, and of transmuting the baser metals into gold and silver. Among the alchemists it was generally thought necessary to find a substance which, containing the original principle of all matter, should possess the power of dissolving all substances into their elements. This general solvent, or *menstruum universale*, which at the same time was to possess the power of removing all the seeds of disease out of the human body and renewing life, was called the *philosopher's stone*, *lapis philosophorum*, and its pretended possessors were known as *adepts*. Alchemy flourished chiefly in the middle ages, though how old might be such notions as those by which the alchemists were inspired it is difficult to say. The mythical Hermes Trismegistus of pre-Christian times was said to have left behind him many books of magical and alchemical learning, and after him alchemy received the name of the *hermetic art*. At a later period chemistry and alchemy were cultivated among the Arabians, and by them the pursuit was introduced into Europe, the studies of the alchemists lead-

ing to valuable chemical discoveries. Many of the monks devoted themselves to alchemy, although they were latterly prohibited from studying it by the popes. But there was one even among these, John XXII, who was fond of alchemy. Raymond Lully, or Lullius, a famous alchemist of the thirteenth and fourteenth centuries, is said to have changed for King Edward I a mass of 50,000 lbs. of quicksilver into gold, of which the first rose-nobles were coined. Among other alchemists may be mentioned Paracelsus and Basilus Valentinus. When more rational principles of chemistry and philosophy began to be diffused and to shed light on chemical phenomena the rage for alchemy gradually decreased. It is still impossible to assert anything with certainty about the transmutation of metals.

Alcibiades (al-se-bi'a-dēs), an Athenian of high family and of great abilities, but lacking moral principle, was born at Athens in B.C. 450, being the son of Cleinias, and a relative of Pericles, who also was his guardian. In youth he was remarkable for the beauty of his person, no less than for the dissoluteness of his manners. He came under the influence of Socrates, but little permanent effect was produced on his character by the precepts of the sage. He acquired great popularity by his liberality in providing for the amusements of the people, and after the death of Cleon attained a political ascendancy which left him no rival but Nicias. Thus he was enabled to play an important part in the long-continued Peloponnesian war. In 415 he advocated an expedition against Sicily, and was chosen one of the leaders, but before the expedition sailed he was charged with profaning and divulging the Eleusinian mysteries, and mutilating the busts of Hermes, which were set up in public all through Athens. Rather than stand his trial he went over to Sparta, divulged the plans of the Athenians, and assisted the Spartans to defeat them. Sentence of death and confiscation was pronounced against him at Athens, and he was cursed by the ministers of religion. He soon left Sparta and took refuge with the Persian satrap Tissaphernes, ingratiating himself by his affectation of Persian manners, as he had previously done at Sparta by a similar affectation of Spartan simplicity. He now began to intrigue for his return to Athens, offering to bring Tissaphernes over to the Athenian alliance, and latterly he was recalled and his banishment cancelled. He, however, remained abroad for some years in command of the Athenian forces, gained several victories, and took Chalcedon and

Byzantium. In A.C. 407 he returned to Athens, but in 406 the fleet which he commanded having suffered a severe defeat, he was deprived of his command. He once more went over to the Persians, taking refuge with the satrap Pharnabazus of Phrygia, and here he was assassinated in B.C. 404.

Alcinous (al-sin'o-us), King of the Phæaciæns. See *Ulysses*.

Alcira (al-thē'ra), a well-built and strongly fortified town of Spain, province of Valencia, founded by the Carthaginians. Pop. of commune 20,572.

Aloman (alk'man), the chief lyric poet of Sparta, a Lydian by birth, flourished between B.C. 671 and 631, and wrote (in the Doric dialect) love songs, hymns, pæans, etc., of which only fragments remain.

Alcmena. See *Amphitryon*.

Alco (al'kō), the native American generic name of *Canis familiaris*, var. *Americanus*, a dog inhabiting Peru and Mexico, having a small head, large, pendulous ears, an arched back, a short and pendant tail. The fur is long, yellowish on the back and the tail is whitish. It is akin to the shepherd dog and has been domesticated.

Alcobaça (al-kō-bū'sā), a small town of Portugal, 50 miles N. of Lisbon, celebrated for a magnificent Cistercian monastery founded in 1148 by Don Alphonso I, and containing several royal tombs. Pop. 2,309.

Alcohol (al'kō-hol), the hydroxides of hydrocarbon radicals, is the spirituous or intoxicating part of starch or sugar containing liquids that have undergone fermentation, it being extracted by distillation—a limpid, colorless liquid, of an agreeable smell and a strong, pungent taste. When brandy, whisky, and other spirituous liquors, themselves distilled from cruder materials, are again distilled, highly volatile alcohol is the first product to pass off. The alcohol thus obtained contains much extraneous matter, including a proportion of water, from the first as high as 20 or 25 per cent, and increasing greatly as the process continues. Charcoal and carbonate of soda put in the brandy or other liquor partly retain the fusel-oil and acetic acid it contains. The product thus obtained by distillation is called *rectified spirits* or *spirits of wine*, and contains from 55 to 85 per cent. of alcohol, the rest being water. By distilling rectified spirits over carbonate of potassium, powdered quicklime, or chloride of calcium, the greater part of the water is

retained, and nearly pure alcohol passes over. It is only, however, by very prolonged digestion with desiccating agents and subsequent distillation that the last traces of water can be removed. The specific gravity of alcohol varies with its purity, decreasing as the quantity of water it contains decreases. This property is a convenient test of the alcoholic strength of liquors that contain only alcohol and water; but on account of the condensation that invariably takes place on the mixture of these two liquids, it can be applied only in connection with special tables of reference, or by means of an instrument specially adapted for the purpose. (See *Alcoholometer*.) Alcohol is composed of carbon, hydrogen, and oxygen, in the proportions expressed by the formula C_2H_5OH . This is ethyl or grain alcohol, the only variety fit for internal use. Under a barometric pressure of 29.5 inches it boils at $173^\circ F.$ ($78.4^\circ C.$); in the exhausted receiver of an air-pump it boils at ordinary temperatures. Its congelation has been effected only in recent times at the low temperature of $-203^\circ F.$ Its very low freezing-point renders it valuable for use in thermometers for very low temperatures. Alcohol is extremely inflammable, and burns with a pale-blue flame, scarcely visible in bright daylight. It occasions no carbonaceous deposit upon substances held over it, and the products of its combustion are carbon dioxide and water. The steady and uniform heat which it gives during combustion makes it a valuable material for fuel. It dissolves the vegetable acids, the volatile oils, the resins, tan, and extractive matter, and many of the soaps; the greater number of the fixed oils are taken up by it in small quantities only, but some are dissolved largely. When alcohol is submitted to distillation with certain acids a peculiar compound is formed, called *ether* (which see). It is alcohol which gives all intoxicating liquors the property whence they are so called. Alcohol acts strongly on the nervous system, and though in small doses it is stimulating and exhilarating, in large doses it acts as a poison. In medicine it is often of great service.

The name alcohol is also applied in chemistry to a large group of compounds of carbon, hydrogen, and oxygen whose chemical properties are analogous to that of common or ethylic alcohol. Methyl or wood alcohol (CH_3OH) is extremely poisonous when ingested, producing blindness and death. Under a recent law denatured alcohol, that is, alcohol which has been made unfit for use as a beverage by

the addition of nauseous ingredients, may be used as fuel or for other industrial purposes without payment of the internal tax laid on untreated alcohol.

Alcoholism (al'kô-hol-izm), a morbid condition of the body (especially of the nervous system) brought on by the immoderate use of alcoholic liquors.

Alcoholometer (om'e-ter), an instrument constructed on the principle of the hydrometer to determine from the specific gravity of spirituous liquors the percentage of alcohol they contain, the scale marking directly the required proportion. If the liquor contain anything besides water and alcohol, previous distillation is necessary.

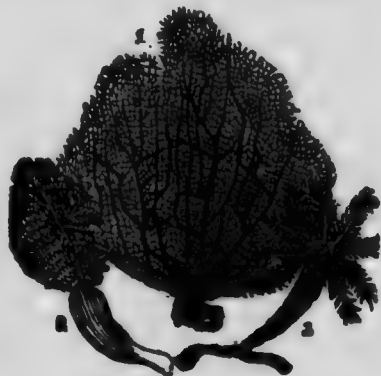
Alcott (al'kot), AMOS BRONSON, American educator and writer, father of Louisa May Alcott; born 1799; died 1888. In 1834 he opened a school at Boston, which by its revolutionary methods attracted the unfavorable notice of the public. It did not prove pecuniarily successful, and in 1839 he gave it up, though he had won the affection of his pupils and his educational methods had awakened the interest of students of pedagogy. On his return from a visit to England he started a communistic farm experiment, 'Fruitlands,' near Harvard, Mass., but shortly abandoned the project. The most important of his works are *Tablets and Concord Days*.

Alcott, LOUISA MAY, an American authoress, born Nov. 29, 1832, at Germantown, a suburb of Philadelphia, Pa. She wrote a number of books chiefly intended for the young: *Little Women*, *An Old-Fashioned Girl*, *Little Men*, *Jack and Gill*, etc. Died March 6, 1888.

Alcuin (alk'win; in his native tongue *Eulhwin*), a learned Englishman, the confidant, instructor, and adviser of Charles the Great (Charlemagne). He was born at York in 735, and was educated and later had the management of the school at York. Alcuin having gone to Rome, Charlemagne became acquainted with him at Parma, invited him in 782 to his court, and made use of his services in his endeavors to civilize his subjects. To secure the benefit of his instructions Charlemagne established at his court a school, called *Schola Palatina*, or the Palace School. In the royal academy Alcuin was called *Flaccus Albinus*. Most of the schools of that period in France were either founded or improved by him; thus he founded the school in the abbey of St. Martin of Tours, in 796, after the plan of the school in York. Alcuin left the court in 801, and retired to the abbey of St. Martin of Tours, but kept up a constant correspondence with Charles to his

death in 804. He left works on theology, philosophy, rhetoric, also poems and letters, all of which have been published.

Alcyonaria (al-si-ō-nā'ri-a), coelenterate animals forming a great division of the class Actinosea (see *Sea-anemone*). These animals are nearly all composite, and the individual polyps have mostly eight tentacles. They



Alcyonaria.

1. Sea-fan (*Gorgonia flabellum*). 2. Sea-pen (*Pennatulula phosphorea*). 3. *Cornularia rugosa*.

include the organ-pipe corals, sea-pens, fan-corals, etc., as also the red coral of commerce. The polyps essentially resemble those of the genus *Alcyonium* in structure, and in the number and arrangement of the tentacles. See *Alcyonium*.

Alcyonium (al-si-ō'ni-um), a genus of coelenterate animals, one familiar species of which, dredged around the British coasts—*A. digitatum*—is named 'Dead-Men's Fingers,' or 'Cows' Paps,' from its lobed or digitate appearance. It grows attached to stones, shells, and other objects. It consists of a mass of little polyps, each polyp possessing eight little fringed tentacles disposed around a central mouth. The *Alcyonium* forms the type of the *Alcyonaria*.

Aldan (al'dan), a river of Eastern Siberia, a tributary of the Lena, 1200 miles in length. The Aldan Mountains run along parallel to it on the left for 400 miles.

Aldebaran (al-deb'a-ran), a star of the first magnitude, forming the eye of the constellation Taurus or the Bull, the brightest of the five stars known to the Greeks as the Hyades. Spectrum analysis has shown it to contain antimony, bismuth, iron, mercury, hydrogen, sodium, calcium, etc.

Aldehyde (al'de-hid), the oxidation product of an alcohol intermediate between it and its acid. Com-

mon aldehyde (CH_3COH) is derived from spirit of wine by oxidation, and is a colorless, limpid, volatile, and inflammable liquid, with a peculiar ethereal odor, which is suffocating when strong; specific gravity, 0.79. It oxidizes in air, and is converted into acetic acid. It rapidly decomposes oxide of silver, depositing a brilliant film of metallic silver; hence it is used in silvering curved glass surfaces.

Alder (al'dér; *Alnus*), a genus of plants, nat. order Betulaceæ (Birch), consisting of trees and shrubs inhabiting the temperate and colder regions of the globe. Common alder (*Alnus glutinosa*) is a tree which grows in wet situations in Europe, Asia, and the United States. Its wood, light and soft and of a reddish color, is used for a variety of purposes, and is well adapted for work which is to be kept constantly in water. The roots and knots furnish a beautifully-veined wood well suited for cabinet work. The bark is used in tanning and leather dressing, and by fishermen for staining their nets. This and the young twigs are sometimes employed in dyeing, and yield different shades of yellow and red. With the addition of copperas it yields a black dye.

Alderman (al'dér-man; Anglo-Saxon *ealdorman*, from *ealdor*, older, and *man*), among the Anglo-Saxons a person of a rank equivalent to that of an earl or count, the governor of a shire or county, and member of the *witena-gemót* or great council of the nation. Aldermen, at present, in the United States and England, are officers associated with the mayor of a city for the administration of the municipal government, constituting a local legislating body.

Alderney (al'dér-nē, French *Aurigny*), an island belonging to Britain off the coast of Normandy, the most northerly of the Channel Islands, between 3 and 4 miles long, and about $1\frac{1}{4}$ broad. The coast is bold and rocky, the interior fertile. About a third of the island is occupied by grass lands; and the Alderney cows, a small-sized but handsome breed, are famous for the richness of their milk. The climate is mild and healthy. A judge, with six 'jurats,' chosen by the people for life, and twelve 'douzaniers,' representatives of the people, form a kind of local legislature. The French language still prevails among the inhabitants, but all understand and many speak English. The *Race of Alderney* is the strait between the coast of France and this island. Pop. about 2,000.

Aldershot (al'dér-shot), a town and military station in England, the latter having given rise to the

former. The station is used for exercise in camp life and the arts of war. Pop. (including military), 35,175.

Aldhelm, St. (äld'helm), English scholar and prelate, Bishop of Sherborne, born 640; died 709. He was a great fosterer of learning. His writings are preserved in *Patres Ecclesie Anglicæ*.

Aldine Editions, the name given to the works which proceeded from the press of Aldus Manutius and his family at Venice (1490-1597). (See *Manutius*.) Recommended by their value, as well as by a splendid exterior, they have gained the respect of scholars and the attention of book-collectors. Many of them are the first printed editions (*editiones principes*) of Greek and Latin classics. Others are texts of the modern Italian authors. These editions are of importance in the history of printing. Aldus had nine kinds of Greek type, and no one before him printed so much and so beautifully in this language. Of the Latin character, he had fourteen kinds of type and was the inventor of italic type.

Aldobrandini (äld-do-bran-dē'nē), the name of a Florentine family which rose to princely rank, produced one pope (Clement VIII) and several cardinals, archbishops, bishops, and men of learning. It is now extinct. —ALDOBRANDINI MARRIAGE, an ancient fresco painting belonging probably to the time of Augustus, discovered in 1606, and acquired by Cardinal Aldobrandini, nephew of Clement VIII, now in the Vatican. It represents a marriage scene in which ten persons are portrayed, and is considered one of the most precious relics of ancient art.

Aldred (äld'red), or EALDRED, Anglo-Saxon prelate, Bishop of Worcester and Archbishop of York, born 1000 (?), died 1069. He improved the discipline of the church and built several ecclesiastical edifices. On the death of Edward the Confessor he is said to have crowned Harold. Having submitted to the Conqueror, whose esteem he enjoyed and whose power he made subservient to the views of the church, he also crowned him as well as Matilda.

Aldrich (äld'ritch), HENRY, Dean of Christchurch, Oxford; born in 1647, died in 1710; distinguished as a writer on logic, as an architect, and as a musician. His *Compendium of Logic* was a text-book till quite recently. He adapted many of the works of the older musicians, such as Palestrina and Carissimi, to the liturgy of the Church of England, and composed many services

and anthems.

Aldrich (äld'rij), NELSON WILMARTH, a prominent American legislator, born at Foster, R. I., Nov. 6, 1841. Elected to the State Assembly in 1875, he became its speaker in the following year; representative in Congress in 1879; and was United States Senator from Rhode Island, 1881-1911. He attained great influence in the Senate, was a forceful advocate of high protective tariff and led the fight in the Senate for the Payne-Aldrich tariff bill of 1909. He died April 16, 1915.

Ald'rich, THOMAS BAILEY, an American poet and writer of prose tales, mostly humorous, born in 1836, was a short time in a mercantile house, but soon adopted literature as a profession and was for a time editor of the *Atlantic Monthly*. He published in verse: *Ballad of Baby Bell*; *Pampinea* and other Poems; *Cloth of Gold* and other Poems, etc.; in prose, *Story of a Bad Boy*; *Margorie Daw*, etc. He died in 1907.

Aldridge (äld'rij), IRA, the 'African Roscius,' born near Baltimore, Md., in 1810, died in 1867. He made a successful début in the Royal Theater, London, in *Othello*. On the continent he took high rank in Shakespeare's tragedies; had presents of crosses and medals from emperors and kings; a member of many of the great academies.

Aldrovandi (äld-ro-vän'dē) ULYSSES, a distinguished Italian naturalist, born 1522, died 1605. He was professor at Bologna, and established botanical gardens and museums of natural history there; wrote a work on natural history in thirteen volumes.

Ale, and BEER, well known and much used fermented liquors. See *Brewing*.

Aleardi (ä-lä-är'dē), ALEARDO, a distinguished Italian lyrical and political poet and patriot, born 1812, died 1878. He was a member of the Italian parliament and professor of æsthetics at Brescia.

Ale-conner, formerly an officer in England appointed to assay ale and beer, and to take care that they were good and wholesome.

Ale-cost. See *Costmary*.

Alec'to, in Greek mythology, one of the Furies. See *Furies*.

Aleman (ä-le-män'), MATEO, a Spanish novelist, born about the middle of the sixteenth century, died in 1610. His fame rests on his *Life and Adventures of the Rogue Guzman de Alfarache*, one of the best of the picaresque or rogue novels, which give such a lively picture of

the shady classes of society in Spain during the sixteenth and seventeenth centuries. The hero becomes in succession stable-boy, beggar, porter, thief, man of fashion, soldier, valet, merchant, student, robber, galley-slave, and finally his own biographer.

Alemanni, or ALAMANNI (ä-la-män'-nē), a confederacy of several German tribes which, at the commencement of the third century after Christ, lived near the Roman territory, and came then and subsequently into conflict with the imperial troops. Caracalla first fought with them in 213, but did not conquer them; Severus was likewise unsuccessful. About 250 they began to cross the Rhine westwards, and in 255 they overran Gaul along with the Franks. In 259 a body of them was defeated in Italy at Milan, and in the following year they were driven out of Gaul by Postumus. But the Alemanni did not desist from their incursions, notwithstanding the numerous defeats they suffered at the hands of the Roman troops. In the fourth century they crossed the Rhine and ravaged Gaul, but were severely defeated by the Emperor Julian and driven back. Subsequently they occupied a considerable territory on both sides of the Rhine; but Clovis broke their power in 496 and deprived them of a large portion of their possessions. Part of their territory was latterly formed into a duchy called Alemannia or Swabia, this name being derived from Suevi or Swabians, the name which they gave themselves. It is from the Alemanni that the French have derived their names for Germans and Germany in general, namely, *Allemands* and *Allemagne*, though strictly speaking only the modern Swabians and northern Swiss are the proper descendants of that ancient race.

Alembert, D' (ä-län-bär), JEAN LE ROND, a French mathematician and philosopher, born in Paris in 1717, and died there in 1783. He was the illegitimate son of Madame de Tencin, and was exposed at the Church of St. Jean le Rond (hence his name) soon after birth. He was brought up by the wife of a poor glazier, and with her he lived for more than forty years. His parents never publicly acknowledged him, but his father settled upon him an income of 1200 livres. He showed much quickness in learning, entered the Collège Mazarin at the age of twelve, and studied mathematics with enthusiasm and success. Having left college he studied law and became an advocate, but did not cease to occupy himself with mathematics. A pamphlet on the motion of solid bodies

in a fluid, and another on the integral calculus, which he laid before the Academy of Sciences in 1739 and 1740, showed him in so favorable a light that the Academy received him in 1741 into the number of its members. He soon after published his famous work on dynamics, *Traité de Dynamique* (1743); and that on fluids, *Traité des Fluides*. He also took a part in the investigations which completed the discoveries of Newton respecting the motion of the heavenly bodies, and published at intervals various important astronomical dissertations, as well as on other subjects. He also took part, with Diderot and others, in the celebrated *Encyclopédie*, for which he wrote the *Discours Preliminaire*, as well as many philosophical and almost all the mathematical articles. He received an invitation from the Russian empress Catherine II to go to St. Petersburg, and Frederick the Great invited him to Berlin, but in vain. From Frederick, however, he accepted a pension. There was an intimate friendship between him and Voltaire.

Alembic (a-lem'bik), a simple apparatus formerly used by chemists for distillation. The *cucurbit*, or body, contains the substance to be distilled, and is usually somewhat like a bottle, bulging below and narrowing towards the top; the *head*, of a globular form, with a flat under-ring, fits on to the neck of the cucurbit, condenses the vapor from the heated liquid, and receives the distilled liquid on the ring inclosing the neck of the lower vessel, and thus causes it to find egress by a discharging pipe into the third section, called the *receiver*.

Alemtejo (ä-län-tä'zhō; beyond the Tagus), the largest province of Portugal, and the most southern except Algarve; area 9,430 square miles; pop. 416,105. The capital is Evora.

Alençon (ä-län-sōn), a town of France, capital of department Orne, and formerly of the Duchy of Alençon, on the right bank of the Sarthe, 105 miles west by south of Paris; well built; has a fine Gothic church (fifteenth century), and interesting remains of the old castle of the Dukes d'Alençon. Alençon was long famed for its point-lace, called 'point d'Alençon,' a branch of industry now much fallen off; it has cotton and flax spinning and weaving, etc.; fine rock-crystal, yielding the so-called 'diamants d'Alençon,' is found in the neighboring granite quarries. Pop. 14,378.—ALENÇON, originally a county, later a dukedom, became united with the crown in 1221, and was given by Louis XI as an appanage

Alentejo

to his fifth son, with whom the branch of the Alençon-Valois commenced. The first duke of the name lost his life at the battle of Agincourt in 1415; another, called Charles IV, married the celebrated Margaret of Valois, sister of Francis I. He commanded the left wing of the French army at the battle of Pavia, where, instead of supporting the king at a critical moment, he fled at the head of his troops, the consequence of which was the loss of the battle and the capture of the king.

Alentejo. See *Alemtejo*.

Aleppo (a-lep'po), a city of Asiatic Turkey, in North Syria, on the river Koik, in a fine plain 60 miles southeast of Alexandretta, which is its port, and 195 miles N. N. E. of Damascus. It has a circumference of about 7 miles, and

still a trade, however, in wool, cotton, silk, wax, skins, soap, tobacco, etc., and imports a certain quantity of European manufactures.—Aleppo was a place of considerable importance in very remote times. By the Greeks and Romans it was called *Beræa*. It was conquered by the Arabs in 638, and its original name, *Chaiybon*, was then turned into *Haleb*, whence the Italian form *Aleppo*. Its population, 200,000 at the beginning of the last century, is now estimated at 127,000, of whom perhaps 25,000 are Christians. The language generally spoken is Arabic.

Aleshki (a-lesh'kē) a town of Southern Russia, gov. Taurida, on the Dnieper. Pop. 9,119.

Alesia (a-lē'zia), a town and fortress of ancient Gaul, at which in B. C. 52 Julius Cæsar inflicted a crushing



Aleppo.

consists of the old town and numerous suburbs. Its appearance at a distance is striking, and the houses are well built of stone. On a hill stands the citadel, and at its foot the governor's palace. Previous to 1822 Aleppo contained about 100 mosques, but in that year an earthquake laid the greater part of them in ruins, and destroyed nearly the whole city. The aqueduct built by the Romans is the oldest monument of the town. Among the chief attractions of Aleppo are its gardens, in which the pistachio-nut is extensively cultivated. Formerly the city was the center of a great import and export trade, and its manufactures, consisting of shawls, cottons, silks, gold and silver lace, etc., were very valuable, but the earthquake already mentioned and various other causes have combined greatly to lessen its prosperity. It has

defeat on the Gauls under Vercingetorix. It is now represented by the village of Alise, department Côte d'Or, near which Napoleon III erected a colossal statue of Vercingetorix in 1865.

Alessandria (äl-es-sän'dre-ä), a town and fortress in North Italy, capital of the province of the same name, in a marshy country, near the junction of the Bormida and the Tanaro. It was built in 1168 by the Cremonese and Milanese, and was named in honor of Pope Alexander III, who made it a bishop's see. It has a cathedral, important manufactures of linen, woolen, and silk goods, and an active trade. It ranks as one of the first fortresses of Europe, the fortifications including a surrounding wall and bastions, and a strong citadel on the opposite side of the Tanaro, connected by a bridge with the town.

Two miles distant is the battlefield of Marango. Pop., exclusive of suburbs, 71,298.

Alessi (a-les'se), GALEAZZO, a distinguished Italian architect, born at Perugia, 1512; died there in 1572. Many palaces, villas, and churches were erected after his designs.

Aletsch (ä'letch) glacier, the greatest glacier in Switzerland, canton Valais, a prolongation of the immense mass of glaciers connected with the Jungfrau, the Aletschhorn (14,000 ft.), and other peaks; about 13 miles long.

Aleurometer (a-lū-rom'e-ter), an instrument for indicating the bread-making qualities of wheaten flour. The indications depend upon the expansion of the gluten contained in a given quantity of flour when freed of its starch by pulverization and repeated washings with water.

Aleutian (a-lū'shan) ISLANDS, a chain of about 150 small islands belonging to the United States, and included in Alaskan boundaries; they separate Bering Sea from the northern part of the Pacific Ocean, and extend nearly 1000 miles from east to west between lon. 163° and 178° w.; total area 6391 square miles; pop. 2000. They are of volcanic formation and in a number of them there are volcanoes still in activity. Their general appearance is dismal and barren, yet grassy valleys capable of supporting cattle throughout the year are met with, and potatoes, turnips, and other vegetables are successfully cultivated. They afford also an abundance of valuable fur and of fish. The natives, known as Aleuts, belong ethnographically to the same stock as those found in Kamchatka.

Ale'wife (corruption of the Indian name), the *Alōsa tyrannus*, a fish of the same genus as the shad, growing to the length of 12 inches, and taken in great quantities in the tidal waters of the rivers of New England, New Brunswick, and Nova Scotia, being salted and exported. It occurs also farther south, is called spring herring in some places, and as an article of food is considered in the United States much superior to the herring.

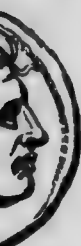
Alexander (al-eks-an'dery), surnamed *the Great*, was the son of Philip of Macedon and his queen Olympias, and was born at Pella, B.C. 356. In youth he had Aristotle as instructor, and he early displayed uncommon abilities. The victory of Charonea in 338, which brought Greece entirely under Macedonian, was mainly decided by his efforts. Philip having been assassinated, B.C. 336, Alexander, not yet twenty years

of age, ascended the throne. His father had been preparing an expedition against the Persians and Alexander determined to carry it out; but before doing so he had to chastise the barbarian tribes on the frontiers of Macedon as well as quell a rising in Greece, in which he took and destroyed Thebes, put 6,000 of the inhabitants to the sword, and carried 30,000 into captivity. Leaving Antipater to govern in his stead in Europe, and being confirmed as commander-in-chief of the Greek forces in the general assembly of the Greeks, he crossed over the Hellespont into Asia, in the spring of 334, with 30,000 foot and 5,000 horse. His first encounter with the Persian forces (assisted by Greek mercenaries) was at the small river Granicus, where he gained a complete victory. Most of the cities of Asia Minor now opened their gates to the victor, and Alexander restored democracy in all the Greek cities. In passing through Gordium he cut the Gordian knot, on which it was believed the fate of Asia depended, and then conquered Lycia, Ionia, Caria, Pamphylia, and Capadocia. A sickness, caused by bathing in the Cydnus (B.C. 333), checked his course; but scarcely was he restored to health when he continued his onward course, and this same year defeated the Persian emperor Darius and his army of 500,000 or 600,000 men (including 50,000 Greek mercenaries) near Issus (inner angle of the Gulf of Alexandretta). Darius fled towards the interior of his dominions, leaving his family and treasures to fall into the hands of the conqueror. Alexander did not pursue Darius, but proceeded southwards, and secured all the coasts along the Mediterranean Sea, though he did not get possession of Tyre (taken 332 B.C.) without a siege of seven months. Palestine and Egypt now fell before him, and in the latter he founded Alexandria, which became one of the first cities of ancient times. Thence he went through the desert of Libya to consult the oracle of Zeus Ammon, and it was said that the god recognized him as his son. On his return Alexander marched against Darius, who had collected an immense army in Assyria, and rejected the proposals of his rival for peace. A battle was fought at Gaugamela, about 50 miles from Arbela,



Coin of Alexander the Great.

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Alexander

B.C. 331, and notwithstanding the immense numerical superiority of his enemy, Alexander (who had but 40,000 men and 7,000 horse) gained a complete victory. Babylon and Susa opened their gates to the conqueror, who marched towards Persepolis, the capital of Persia, and entered it in triumph. He now seems for a time to have lost his self-control. He gave himself up to arrogance and dissipation, and is said in a fit of intoxication to have set fire to the palace of Persepolis, one of the wonders of the world. Rousing himself up, however, he set out in pursuit of Darius, who, having lost his throne, was kept prisoner by Bessus, satrap of Bactriana. Bessus, when he saw himself closely pursued, caused Darius to be assassinated (B.C. 330). Continuing his progress he subdued Bessus and advanced to the Jaxartes, the extreme eastern limit of the Persian empire, but did not fully subdue the whole of this region till 328, some fortresses holding out with great tenacity. In one of these he took prisoner the beautiful Roxana, daughter of Oxyartes, a nobleman of Sogdiana, and having fallen in love with her he married her. Meantime disaffection had once or twice manifested itself among his Macedonian followers and had been cruelly punished; and he had also, to his lasting remorse, killed his faithful friend Cleitus in a fit of drunken rage. Alexander now formed the idea of conquering India, then scarcely known even by name. He passed the Indus (B.C. 326), marched towards the Hydaspes (Jhelum), at the passage of which he conquered a king named Porus in a bloody battle, and advanced victoriously through the northwest of India, and intended to proceed as far as the Ganges, when the murmurs of his army compelled him to return. On the Hydaspes he built a fleet, in which he sent a part of his army down the river, while the rest proceeded along the banks. By the Hydaspes he reached the Acesines (Chenab), and thus the Indus, down which he sailed to the sea. Nearchus, his admiral, sailed hence to the Persian Gulf, while Alexander directed his march by land to Babylon, losing a great part of his troops in the desert through which he had to pass. In Susa he married Statira, the eldest daughter of Darius, and rewarded those of his Macedonians who had married Persian women, because it was his intention to unite the two nations as closely as possible. At Opis, on the Tigris, a mutiny arose among his Macedonians (in 324), who thought he showed too much favor to the Asiatics. By firmness and policy he succeeded in quelling this rising, and sent home 10,000

Alexander

veterans with rich rewards. Soon after, his favorite, Hephaestion, died at Ecbatana, and Alexander's grief was unbounded. The favorite was royally buried at Babylon, and here Alexander was engaged in extensive plans for the future, when he became suddenly sick, after a banquet, and died in a few days (323 B.C.), in his thirty-third year, after a reign of twelve years and eight months. His body was after a time conveyed to Egypt with great splendor by his general Ptolemy. He left behind him an immense empire, which was divided among his chief generals, and became the scene of continual wars. The reign of Alexander constitutes an important period in the history of humanity. His career was not simply a series of empty conquests, but was attended with the most important results. The language, and much of the civilization of Greece, followed in his track; large additions were made to the sciences of geography, natural history, etc.; a road was opened to India; and the products of the farthest east were introduced into Europe. Greek kingdoms, under his generals and their successors, continued to exist in Asia for centuries.

Alexander, the name of eight popes, the earliest of whom, Alexander I, is said to have reigned from 109 to 119. The most famous (or notorious) is Alexander VI (Borgia), who was born at Valencia, in Spain, in 1431, and died in 1503. When he was only twenty-five years of age his uncle, Pope Calixtus III, made him a cardinal, and shortly afterwards appointed him to the dignified and lucrative office of vice-chancellor. He subsequently became Cardinal Bishop of Albano and in 1492, after the death of Innocent VIII, was elected Pope. As such he showed himself able and energetic, clearing Rome of the bandits who infested it and repressing the insolence and rapacity of the nobles, reformed the ecclesiastical discipline, sent many missionaries abroad and encouraged the arts, especially painting and literature. In addition he put an end to the famines which had often desolated Rome, suppressed magic in Germany and Bohemia, and issued many notable bulls and other documents, the whole going to indicate remarkable mental power and activity. Several Italian and other historians have accused him of licentiousness in his earlier career, and of simony, nepotism and cruelty as Pope, charges which it is difficult to reconcile with the high qualities manifested by him and his distinguished deeds. The accusations do not fit well with the known character of his career in the papal chair, and of

Alexander

Alexander II

late years historians are inclined to doubt the serious accusations made against him. Not long after his election Alexander decided the dispute between Spain and Portugal concerning their claims to the new found countries beyond the ocean.

Alexander, the name of three Scottish kings. **ALEXANDER I**, a son of Malcolm Canmore and Margaret of England, succeeded his brother Edgar in 1107, and governed with great ability till his death in 1124. He was a great benefactor of the church, and a firm vindicator of the national independence.—**ALEXANDER II** was born in 1198, and succeeded his father William the Lion in 1214. He was a wise and energetic prince, and Scotland prospered greatly under him, though disturbed by the Norsemen, by the restlessness of some of the Celtic chiefs, and by the attempts of Henry III of England to make Alexander do homage to him. Alexander married Henry's sister, Joan, in 1221, who lived till 1238. In 1244 war with England almost broke out, but was fortunately averted. Alexander died in 1248 at Kerrera, an island opposite Oban, when on an expedition in which he hoped to wrest the Hebrides from Norway. He was succeeded by his son, **ALEXANDER III**, a boy of eight, who in 1251 married Margaret, eldest daughter of Henry III of England. Like his father he was eager to bring the Hebrides under his sway, and this he was enabled to accomplish in a few years after the defeat of the Norse King Haco at Largs, in 1263. The mainland and islands of Scotland were now under one sovereign, though Orkney and Shetland still belonged to Norway. Alexander was strenuous in asserting the independence both of the Scottish kingdom and the Scottish church against England. He died in 1285 by the falling of his horse while he was riding in the dark between Burnt-Island and Kinghorn. He left as his heiress Margaret, the Maiden of Norway, daughter of Eric of Norway, and of Alexander's daughter, Margaret. Under him Scotland enjoyed greater prosperity than for generations afterwards.

Alexander I, Emperor of Russia, son of Paul I and Maria, daughter of Prince Eugene of Wurtemberg, was born in 1777, and died in 1825. On the assassination of his father, in 1801, Alexander ascended the throne, and one of his first acts was to conclude peace with Britain, against which his predecessor had declared war. In 1803 he offered his services as mediator between England and France, and two years later a convention was entered into between Russia, England, Austria, and

Sweden for the purpose of resisting the encroachments of France on the territories of independent states. He was present at the battle of Austerlitz (1805), when the combined armies of Russia and Austria were defeated by Napoleon. In the succeeding campaign the Russians were again beaten at Eylau (8th February, 1807), and Friedland (14th June), the result of which was an interview between Alexander and Napoleon and the treaty at Tilsit. The Russian emperor now for a time identified himself with the Napoleonic schemes, and soon obtained possession of Finland and an extended territory on the Danube. The French alliance, however, he found to be too oppressive, and his having separated himself from Napoleon led to the French invasion of Russia in 1812, with its disastrous results to Napoleon. In 1813 he published a manifesto which served as the basis of the coalition of the other European powers against France, which was followed by the capture of Paris (in 1814), the abdication of Napoleon and the restoration of the Bourbons, and the utter overthrow of Napoleon the following year. After Waterloo, Alexander, accompanied by the Emperor of Austria and the King of Prussia, made his second entrance into Paris, where they concluded the treaty known as the Holy Alliance. The remaining part of his reign was chiefly taken up in measures of internal reform, including the gradual abolition of serfdom, and the promotion of education, agriculture, commerce, and manufactures, as well as literature and the fine arts.

Alexander II, Emperor of Russia, was born April 29, 1818, and succeeded his father, Nicholas, in 1855, before the end of the Crimean war. After peace was concluded the new emperor set about effecting reforms in the empire, the greatest of all being the emancipation of the serfs in 1861, a measure which gave freedom, on certain conditions, to 22,000,000 of human beings who were previously in a state little removed from that of slavery. Under him, too, representative assemblies in the provinces were introduced, and he also did much to improve education, and to reorganize the judicial system. During his reign the Russian dominions in Central Asia were extended, a piece of territory south of the Caucasus, formerly belonging to Turkey, was acquired, and a part of Bessarabia, belonging since the Crimean war to Turkey in Europe, but previously to Russia, was restored to the latter power. The latter additions resulted from the Russo-Turkish war of 1877-78. He was killed by an explosive

missile flung at him (by a Nihilist it is supposed) in a street in St. Petersburg, 13th March, 1881. He was succeeded by his second son, ALEXANDER III, who had taken an active command in the war with Turkey in 1877-78. After a reign filled with perpetual fear of assassination, he died of disease in 1894.

Alexander I (Obrenovitch), king of Servia, born 1876, succeeded to the throne on the abdication of his father, King Milan, March 6, 1889. A regency was established which ended in 1893. He was killed by army officers during an insurrection June 11, 1903. Succeeded by Peter I.

Alexander of Hales. See *Hales*.

Alexander, JOHN WHITE, an American portrait and figure painter, born at Allegheny, Pennsylvania, October 7, 1856; died May 31, 1915. He studied at Paris and at Munich and came under the influence of Whistler. His portraits of Walt Whitman and Auguste Rodin are characteristic.

Alexander Nevskoi (nev'skoi), a Russian hero and saint, son of the Grand-duke Jaroslav, born in 1219; died in 1263. He fought valiantly against assaults of the Mongols, the Danes, Swedes, and knights of the Teutonic Order. He gained the name of *Nevskoi* in 1240, for a splendid victory, on the Neva, over the Swedes. The gratitude of his countrymen commemorated the hero in popular songs, and raised him to the dignity of a saint.

Alexander Severus (se-v'rus), a Roman emperor, born in 208; died 235 A.D. He was raised to the imperial dignity in 222 A.D. by the praetorian guards, after they had put his cousin, the emperor Heliogabalus, to death. He governed ably both in peace and war; and also occupied himself in poetry, philosophy, and literature. In 232 he successfully repelled the Persians, who wished to drive the Romans from Asia. When on an expedition into Gaul to repress an incursion of the Germans, he was murdered with his mother in an insurrection that took place among his troops.

Alexanders (*Smyrniun olusatrum*), an umbelliferous biennial plant, a native of Britain, formerly cultivated for its leafstalks, which, having a pleasant aromatic flavor, were blanched and used instead of celery—a vegetable that has taken its place.

Alexandretta, or ISKANDERUN (ancient *Alexandria ad Issum*), a small seaport in Asia Minor, on the Gulf of Iskanderun, the port of Aleppo and Northern Syria.

Named after Alexander the Great, at whose command it was founded in memory of the battle of Issus. Pop. about 7,000.

Alexandria (al-eks-an'dri-a), an ancient city and seaport in Egypt, at the northwest angle of the Nile delta, on a ridge of land between the sea and Lake Mareotis. Ancient Alexandria was founded by, and named in honor of, Alexander the Great, in B.C. 332, and was long a great and splendid city, the center of commerce between the east and west, as well as of Greek learning and civilization, with a population at one time of perhaps 1,000,000. It was especially celebrated for its great library, and also for its famous lighthouse, one of the wonders of the world, standing upon the little island of Pharos, which was connected with the city by a mole. Under Roman rule it was the second city of the empire, and when Constantinople became the capital of the East it still remained the chief center of trade; but it received a blow from which it never recovered when captured by Amru, general of Caliph Omar in 641, after a siege of fourteen months. Its ruin was finally completed by the discovery of the passage to India by the Cape of Good Hope, which opened up a new route for the Asiatic trade. See *Alexandrian Library*, *Alexandrian School*.—Modern Alexandria stands partly on what was formerly the island of Pharos, partly on the peninsula which now connects it with the mainland and has been formed by the accumulation of soil, and partly on the mainland. The streets in the Turkish quarter are narrow, dirty, and irregular; in the foreign quarter they are regular and wide, and it is here that the finest houses are situated, and where are the principal shops and hotels, banks, offices of companies, etc.; this part of the city being also supplied with gas, and with water brought by the Mahmudieh Canal from the western branch of the Nile. Alexandria is connected by railway with Cairo, Rosetta, and Suez. A little to the south of the city are the catacombs, which now serve as a quarry. Another relic of antiquity is Pompey's Pillar, 98 ft. 9 in. high. Alexandria has two ports, on the east and west respectively of the isthmus of the Pharos peninsula, the latter having a breakwater over 3,000 yards in length, with fine quays and suitable railway and other accommodation. The trade of Alexandria is large and varied, the exports being cotton, beans, peas, rice, wheat, etc.; the imports chiefly manufactured goods. At the beginning of the century Alexandria

Alexandria

Alexandrian Library

was an insignificant place of 5,000 or 6,000 inhabitants. The origin of its more recent career of prosperity it owes to Mohammed Ali. In 1882 the insurrection of Arabi Pasha and the massacre of Europeans led to the intervention of the British, and the bombardment of the forts by the British fleet in July. When the British entered the city they found the finest parts of it sacked and in flames; it is now handsomely rebuilt. Pop. (1907) 332,246.

Alexandria, a city of Madison Co., Indiana, 11 miles N. of Anderson. It has manufactures of plate glass, lamp chimneys and mineral

Alexandria, a town of Scotland, in Dumbartonshire, on the Leven, 4 miles north of Dumbarton, with extensive cotton printing and bleaching works. Pop. 8,000.

Alexandria, a town of Southern Russia, government of Cherson. Pop. 14,000.

Alexandrian Library, the largest and most famous of all the ancient collections of books, founded by Ptolemy Soter (died 283 B.C.), king of Egypt, and greatly enlarged by succeeding Ptolemies. At its most flourishing period it is said to have numbered 700,000 volumes, accommodated in



Environs of Alexandria, Egypt.

wool, and is in a natural gas region. Pop. 5,096.

Alexandria, a city, county seat of Rapides parish, Louisiana, on the Red River, in the center of the State. It is in the midst of a rich farm and timber section, producing cotton, corn, sugar cane, alfalfa, hay, rice, oats, sorghum, potatoes, fruits, sugar, livestock, etc. There are manufactures of sugar, cotton-seed oil, etc. Pop. 11,213.

Alexandria, a city and port of Virginia, on the w. bank of the Potomac River, 6 miles below Washington. The river here is more than a mile wide, giving a harbor for the largest ships. There are chemical works and manufactures of shoes, furniture, glass, machinery, etc. Pop. 15,329.

two different buildings, one of them being the Serapeion, or temple of Jupiter Serapis. The other collection was burned during Julius Caesar's siege of the city, but the Serapeion library existed to the time of the Emperor Theodosius the Great, when, at the general destruction of the heathen temples, the splendid temple of Jupiter Serapis was gutted (A.D. 391) by a fanatical crowd of Christians, and its literary treasures destroyed or scattered. A library was again accumulated, but is said to have been burned by the Arabs when they captured the city under the caliph Omar in 641. Amru, the captain of the caliph's army, would have been willing to spare the library, but Omar is said to have disposed of the matter in the famous words: 'If these

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Alexandrian School

writings of the Greeks agree with the Koran they are useless, and need not be preserved; if they disagree they are pernicious, and ought to be destroyed.' It is probable, however, that little of the library then remained to be destroyed.

Alexandrian School, or AGE, the

school or period of Greek literature and learning that existed at Alexandria in Egypt during the three hundred years that the rule of the Ptolemies lasted (323-30 B.C.). and continued under the Roman supremacy. Ptolemy Soter founded the famous library of Alexandria (see above) and his son, Philadelphus, established a kind of academy of sciences and arts. Many scholars and men of genius were thus attracted to Alexandria, and a period of literary activity set in, which made Alexandria for long the focus and center of Greek culture and intellectual effort. It must be admitted, however, that originality was not a characteristic of the Alexandrian age, which was stronger in criticism, grammar, and science than in pure literature. Among the grammarians and critics were Zenodotus, Eratosthenes, Aristophanes, Aristarchus, and Zoilus, proverbial as a captious critic. Their merit is to have collected, edited, and preserved the existing monuments of Greek literature. To the poets belong Apollonius, Lycophron, Aratus, Nicander, Euphorion, Callimachus, Theocritus, Philetas, etc. Among those who pursued mathematics, physics, and astronomy was Euclid, the father of scientific geometry; Archimedes, great in physics and mechanics; Apollonius of Perga, whose work on conic sections still exists; Nicomachus, the first scientific arithmetician; and (under the Romans) the astronomer and geographer Ptolemy. Alexandria also was distinguished in philosophical speculation, and it was here that the New Platonic school was established at the close of the second century after Christ by Ammonius of Alexandria (about 193 A.D.), whose disciples were Plotinus and Origen. Being for the most part oriental, formed by the study of Greek learning, the writings of the New Platonists are strikingly characterized—for example, those of Ammonius Saccas, Plotinus, Iamblicus, Porphyrius—by a mixture of Asiatic and European elements. The principal Gnostic systems also had their origin in Alexandria.

Alexandrian Version, or CODEX

ALEXANDRINUS, a manuscript in the British Museum, of great importance in Biblical criticism, written on parchment with uncial letters, and belonging probably to

Alexis Petrovitch

the latter half of the fifth century. It contains the whole Greek Bible (the Old Testament being according to the Septuagint), together with the letters of Bishop Clement of Rome, but it wants parts of Matthew, John, and Second Corinthians. The Patriarch of Constantinople, who in 1628 sent this manuscript as a present to Charles I, said he had received it from Egypt (whence its name).

Alexandrine (al-ex-an'drēn), in prosody, the name given, from an old French poem on Alexander the Great, to a species of verse, which consists of six iambic feet, or twelve syllables, the pause being, in correct Alexandrines, always on the sixth syllable; for example, the second of the following verses:—

A needless Alexandrine ends the song,
Which, like a wounded snake, drags its slow
length along.

In English, Drayton's *Polyolbion* is written in this measure, and the concluding line of the Spenserian stanza is an Alexandrine. The French in their epics and dramas are confined to this verse, which for this reason is called by them the *heroic*.

Alexandropol (drō'pol), a Russian town and fortress in the Transcaucasian government of Erivan, near the highway from Erivan to Kars; can accommodate 10,000 military, and has silk manufactures. Pop. 32,018.

Alexan'drov, a town of Russia, government of Vladimir, with a famous convent, in the church of which are interred two sisters of Peter the Great; manufactures of steel and cotton goods. In the neighborhood is an imperial stud. Pop. 6,848.

Alexisbad (ä-leks'is-bäd), a bathing place of Germany, Anhalt. in the Harz Mountains, with two mineral springs strongly impregnated with iron.

Alexis Michai'lovitch (ä-leks'is; the son of Michael), or MIKHAILOVITCH, the second Russian czar of the line of Romanoff, born in 1629, succeeded his father Michael Feodorovitch in 1645, and died in 1676. He did much for the internal administration and for the enlargement of the empire; reconquered Little Russia from Poland, and carried his authority to the extreme east of Siberia. He was father of Peter the Great.

Alexis Petro'vitch, eldest son of Peter the Great, was born in Moscow, 1690, and died in 1718. He opposed the innovations introduced by his father, who on this account

disinherited him by a ukase in 1718, and when he discovered that Alexis was paving the way to succeed to the crown he had his son tried and condemned to death. He was found dead in prison a few days later, the cause of his death not known. He left a son, afterwards the emperor Peter II.

Alexius Comne'nus (a-leks'i-us), a

Byzantine emperor, was born in 1048, and died in 1118. He was a nephew of Isaac, the first emperor of the Comneni, and attained the throne in 1081, at a time when the empire was menaced from various sides, especially by the Turks and the Normans. From these dangers, as well as from later ones (caused by the First Crusade, the Normans, and the Turks), he managed to extricate himself by policy or warlike measures, and maintained his position till the age of seventy, during a reign of thirty-seven years.

Al'fa, a name for esparto grass or a variety of it, largely obtained from Algeria. See *Esparto*.

Alfalfa (al-fal'fa), a prolific forage plant similar to lucerne, largely grown in the western and Pacific States, especially in Kansas and Nebraska and now being introduced throughout the United States, its very deep rooting enabling it to flourish in soil arid to other grasses. It is also grown in parts of Spanish America. Heavy crops are gathered three or four times a season. See *Lucerne*.

Alfarabi (al-fa-rü'bë), an eminent Arabian scholar of the tenth century; died at Damascus in 950; wrote on the Aristotelian philosophy, and compiled a kind of encyclopedia.

Al'fenid, an alloy of nickel plated with silver, used for spoons, forks, candlesticks, tea services, etc.

Alfieri (äl-fë-ä-rë), VITTORIO, COUNT, Italian poet, was born at Asti in 1749, and died in 1803. After extensive European travels he began to write, and his first play, *Cleopatra* (1775), being received with general applause, he determined to devote all his efforts to attaining a position among writers of dramatic poetry. At Florence he became intimate with the Countess of Albany, wife of Prince Charles Edward Stuart, and on the death of the prince she lived with him as his mistress. This connection he believed to have served to stimulate and elevate his poetic powers. He died at Florence and was buried in the church of Santa Croce, between Machiavelli and Michael Angelo, where a beautiful monument by Canova covers his remains. He wrote twenty-one tragedies

and six comedies. His tragedies are full of lofty and patriotic sentiments, but the language is stiff and without poetic grace, and the plots poor. Nevertheless he is considered the first tragic writer of Italy, and has served as a model for his successors. Alfieri composed also an epic, lyrics, satires, and poetical translations from the ancient classics. He left an interesting autobiography.

Alfon'so. See *Alphonso*.

Al'ford, HENRY, Dean of Canterbury, an English poet, scholar and miscellaneous writer, was born in London in 1810. After attending various schools he graduated from Cambridge and in 1835 became vicar of Wymeswold, Leicestershire. In 1842 he was appointed examiner in logic and moral philosophy to the University of London, and held the appointment till 1857. He early began the great work of his life, his edition of the Greek Testament with commentary, which occupied him for twenty years, the first volume being published in 1849, the fourth and last in 1861. In 1853 he was translated to Quebec Chapel, London, and in 1857 he was appointed Dean of Canterbury. He died in 1871.

Al'fred (or ÆL'FRED) THE GREAT, King of England, one of the most illustrious rulers on record, was born at Wantage, in Berkshire, A.D. 849, his father being Ethelwolf, son of Egbert, King of the West Saxons. He succeeded his brother Ethelred in 872, at a time when the Danes, or Northmen, had extended their conquests widely over the country, and they had completely overrun the kingdom of the West Saxons by 878. Alfred was obliged to flee in disguise, and stayed for some time with one of his own neat-herds. At length he gathered a small force, and having fortified himself on the Isle of Athelney, formed by the confluence of the rivers Parret and Tone, amid the marshes of Somerset, he was able to make frequent sallies against the enemy. It was during his abode here that he went, if the story is true, disguised as a harper into the camp of King Guthrum (or Guthorm), and, having ascertained that the Danes felt themselves secure, hastened back to his troops, led them against the enemy, and gained such a decided victory that fourteen days afterwards the Danes begged for peace. This battle took place in May, 878, near Edington, in Wiltshire. Alfred allowed the Danes who were already in the country to remain, on condition that they gave hostages, took a solemn oath to quit Wessex, and embraced Christianity. Their king, Guthrum, was

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Algae

baptized, with thirty of his followers, and afterwards remained faithful to Alfred. They received that portion of the east of England now occupied by the counties of Norfolk, Suffolk, and Cambridge, as a place of residence. The few years of tranquillity (886-893) which followed were employed by Alfred in rebuilding the towns that had suffered most during the war, particularly London; in training his people in arms and no less in agriculture; in improving the navy; in systematizing the laws and internal administration; and in literary labors and the advancement of learning. He caused many manuscripts to be translated from Latin, and himself translated several works into Anglo-Saxon, such as the *Psalms*, *Æsop's Fables*, Boethius on the *Consolation of Philosophy*, the *History of Orosius*, Bede's *Ecclesiastical History*, etc. He also drew up several original works in Anglo-Saxon. These peaceful labors were interrupted, about 894, by an invasion of the Northmen, who, after a struggle of three years, were finally driven out. Alfred died in 901. He had married, in 868, Alswith or Ealhswith, the daughter of a Mercian nobleman, and left two sons, Edward, who succeeded him, and Ethelwerd, who died in 922. Alfred presents us with one of the most perfect examples of the able and patriotic monarch united with the virtuous man.

Algae (al'jē), a nat. order of cryptogamic or thallogamous plants, found for the most part in the sea and fresh water, and comprising sea-weeds, etc. The higher forms have stems bearing leaf-like expansions, and they are often attached to the rocks by roots, which, however, do not derive nutriment from the rocks. A stem, however, is most frequently absent. The plants are nourished through their whole surface by the medium in which they live. They vary in size from microscopic diatoms to forms whose stems resemble those of forest trees, and whose fronds rival the leaves of the palm. They are entirely composed of cellular tissue, and many are edible and nutritious, as carrageen or Irish moss, dulse, etc. Kelp, iodine, and bromine are products of various species. The Algae are also valuable as manure. They may be divided into four groups:—*Cyanophyceæ* (blue), *Chlorophyceæ* (green), *Phæophyceæ* (brown), and *Rhodophyceæ* (red).

Algardi (äl-gar'dē), ALESSANDRO, an Italian sculptor of the 17th century; born 1602; died 1654. He worked chiefly at Rome; executed the tomb of Leo XI in St. Peter's, and a relief with

life-size figures over the altar of St. Leo there.

Algaro'ba bean. See *Carob-tree*.

Algarobilla (al-gar-o-bil'la), the seed-pods of one or two South American trees (genus *Prosopis*), valuable as containing much tannin.

Algarot (al'ga-rot), a violently purgative and emetic white powder, precipitated from chloride of antimony in water; formerly used in medicine.

Algarotti (äl-gä-rot'tē), FRANCESCO, COUNT, born in 1712, died in 1764, an Italian writer on science, the fine arts, etc. He lived for some years in France and for a long time in Germany, Frederick the Great of Prussia having made him chamberlain and count. He wrote *Newtonianism for the Ladies*; *Essays on the Fine Arts*; poems, letters, etc.

Algarve (äl-gär'vā), a maritime province of Portugal occupying the southern portion of the republic; mountainous but with some fertile tracts. Area, 1,872 square miles; pop. 254,851.

Algau (äl'gou), a name for the southwestern portion of Bavaria and the adjacent parts of Würtemberg and Tyrol, intersected by the Algaun Alps. The Algaun breed of cattle is one of the best in Germany.

Algazzali (äl-gaz-zä'le), ABU HAMED MOHAMMED, an Arabian philosopher, Persian by birth; born 1058, died 1111. He was a most prolific author; an opponent of the prevailing Aristotelian philosophy of the day, and wrote against it the *Destruction of the Philosophers*, answered by Averroes in his *Destruction of the Destruction*.

Algebra (äl'je-bra), a kind of generalized arithmetic, in which numbers or quantities and operations, often also the results of operations, are represented by symbols. Thus the expression $ay+cz+dy^2$ denotes that a number represented by a is to be multiplied by a number represented by y , a number c multiplied by a number a , a number d by a number y multiplied by itself (or squared), and the sum taken of these three products. So the equation (as it is called) $x^2-7x+12=0$ expresses the fact that if a certain number x is multiplied by itself, and this result made less by seven times the number and greater by twelve, the result is 0. In this case x must either be 3 or 4 to produce the given result; but such an equation (or formula) as $(a+b)(a-b)=a^2-b^2$ is always true whatever values may be assigned to a and b . Algebra is an invaluable instrument in intricate calculations

Algebra

of all kinds, and enables operations to be performed and results obtained that by arithmetic would be impossible, and its scope is still being extended.

The beginnings of algebraic method are to be found in Diophantus, a Greek of the fourth century of our era, but it was the Arabians that introduced algebra to Europe, and from them it received its name. The first Arabian treatise on algebra was published in the reign of the great Kaliph Al Mamun (813-833) by Mohammed Ben Musa. In 1202 Leonardo Fibonacci of Pisa, who had traveled and studied in the East, published a work treating of algebra as then understood in the Arabian school. From this time to the discovery of printing considerable attention was given to algebra, and the work of Ben Musa and another Arabian treatise, called the *Rule of Algebra*, were translated into Italian. The first printed work treating on algebra (also on arithmetic, etc.) appeared at Venice in 1494, the author being a monk called Luca Pacioli da Borgo. Rapid progress now began to be made, and among the names of those to whom advances are to be attributed are Tartaglia and Cardan. About the middle of the sixteenth century the German Stifel introduced the signs $+$, $-$, $\sqrt{}$, and Reorde the sign $=$. Recorde wrote the first English work on algebra. Francois Vieta, a French mathematician (1540-1603), first adopted the method which has led to so great an extension of modern algebra, by being the first who used general symbols for known quantities as well as for unknown. It was he also who first made the application of algebra to geometry. Albert Girard extended the theory of equations by the supposition of imaginary quantities. The Englishman Harriot, early in the seventeenth century, discovered negative roots, and established the equality between the number of roots and the units in the degree of the equation. He also invented the signs $<$, $>$, and Oughtred that of $\times$. Descartes, though not the first to apply algebra to geometry, has, by the extent and importance of his applications, commonly acquired the credit of being so. The same discoveries have also been attributed to him as to Harriot, and their respective claims have caused much controversy. He obtained by means of algebra the definition and description of curves. Since his time algebra has been applied so widely in geometry and higher mathematics that we need only mention the names of Fermat, Wallis, Newton, Leibnitz, De Moivre, MacLaurin, Taylor, Euler, d'Alembert, Lagrange, Laplace, Fourier, Poisson, Gauss, Horner, de

Morgan, Sylvester, Cayley, Boole, Jevons, and others who have applied the algebraic method not only to formal logic but to political economy.

Algeciras (al-je-thé-rás), a seaport of Spain, on the west side of the Bay of Gibraltar, a well-built town carrying on a brisk coasting trade. It was the first conquest of the Arabs in Spain (711), and was held by them till 1344, when it was taken by Alphonso XI of Castile after a siege of twenty months. Near Algeciras, in July, 1801, the English defeated the French and Spanish fleets. A conference was held here in 1906 to settle the dispute between France and Germany about Morocco. Pop. 13,302.

Alger (al'jer), RUSSELL A., soldier and statesman, born at Lafayette, Ohio, 1836. After admission to the bar he entered the army as a private in 1861 and served through the war, rising to the rank of brevet-major-general of volunteers. Engaging in business in Michigan, he became governor of that State in 1885, and in 1897 was appointed Secretary of War by President McKinley. He resigned in 1899, having been severely criticised for his management of army affairs during the Spanish-American war. He was appointed United States Senator in 1902 to fill a vacancy and elected 1903. Died January 24, 1907.

Al'ger, WILLIAM ROUNSVILLE, author and clergyman; born in Freetown, Massachusetts, in 1823, died in 1905. He succeeded Theodore Parker as pastor of the Society of Liberal Christians in Boston in 1855, and was minister of the Unitarian Church of the Messiah in New York 1876-78. He wrote *Symbolic History of the Cross of Christ*; *Oriental Poetry*; *Sources of Consolation in Human Life*, and other works.

Algeria (al-je'ri-a), a French colony in North Africa, having on the north the Mediterranean, on the east Tunis, on the west Morocco, and on the south (where the boundary is ill-defined) the desert of Sahara; area, exclusive of the Algerian Sahara, 176,800 sq. miles. The country is divided into three departments—Algiers, Oran, and Constantine. The coast-line is about 550 miles in length, steep and rocky, and though the indentations are numerous the harbors are much exposed to the north wind. The country is traversed by the Atlas Mountains, two chains of which—the Great Atlas, bordering on the Sahara, and the Little, or Maritime Atlas, between it and the sea—run parallel to the coast, the former attaining a height of 7,000 feet.

Algeria

Algeria

The intervals are filled with lower ranges, and numerous transverse ranges connect the principal ones and run from them to the coast, forming elevated tablelands and inclosed valleys. The rivers are numerous, but many of them are mere torrents rising in the mountains near the coast. The *Shelif* is much the largest. Some of the rivers are largely used for irrigation, and artesian wells have been sunk in some places for the same purpose. There are, both on the coast and in the interior, extensive salt lakes or marshes (*Shotts*), which dry up to a great extent in summer. The country bordering on the coast, called the *Tell*, is generally hilly, with fertile valleys; in some places a flat and fertile plain extends between the hills and the sea. In the east there are *Shotts* that sink below the sea-level, and into these it has been proposed to introduce the waters of the Mediterranean. The climate varies considerably according to elevation and local peculiarities. There are three seasons: winter from November to February, spring from March to June, and summer from July to October. The summer is very hot and dry. In many parts of the coast the temperature is moderate and the climate so healthy that Algeria is now a winter resort for invalids.

The chief products of cultivation are wheat, barley, and oats, tobacco, cotton, wine, silk, and dates. Early vegetables, especially potatoes and peas, are exported to France and England. A fiber called *alfa*, a variety of esparto, which grows wild on the high plateaus, is exported in large quantities. Cork is also exported. There are valuable forests, in which grow various sorts of pines and oaks, ash, cedar, myrtle, pistachio-nut, mastic, carob, etc. The Australian *Eucalyptus globulus* (a gum-tree) has been successfully introduced. Agriculture often suffers much from the ravages of locusts. Among wild animals are the lion, panther, hyena, and jackal; the domestic quadrupeds include the horse, the mule, cattle, sheep, and pigs (introduced by the French). Algeria possesses valuable minerals, including iron, copper, lead, sulphur, zinc, antimony, marble (white and red), and lithographic stone.

The trade of Algeria has greatly increased under French rule, France, Spain, and England being the countries with which it is principally carried on, and three-fourths of the whole being with France. The exports (besides those mentioned above) are olive-oil, raw hides, wood, wool, tobacco, oranges, etc.; the imports, manufactured goods, wines, spirits, coffee, etc. The manufacturing

industries are unimportant, and include morocco leather, carpets, muslins, and silks. French money, weights, and measures are generally used. The chief towns are Algiers, Oran, Constantine, Bona, and Tlemcen.

The two principal native races inhabiting Algeria are Arabs and Berbers. The former are mostly nomads, dwelling in tents and wandering from place to place, though a large number of them are settled in the *Tell*, where they carry on agriculture and have formed numerous villages. The Berbers, here called Kabyles, are the original inhabitants of the territory and still form a considerable part of the population. They speak the Berber language, but use Arabic characters in writing. The Jews form a small but influential part of the population. Various other races also exist. Except the Jews, all the native races are Mohammedans. There are now a considerable number of French and other colonists, provision being made for granting them concessions of land on certain conditions. There are over 360,000 colonists of French origin in Algeria, and over 200,000 colonists natives of other European countries (chiefly Spaniards and Italians). Algeria is governed by a governor-general, who is assisted by a council appointed by the French government. The settled portion of the country, in the three departments of Algiers, Constantine, and Oran, is treated much as if it were a part of France, and each department sends two deputies and one senator to the French chambers. Pop. 5,231,850.

The country now called Algeria was known to the Romans as Numidia. It flourished greatly under their rule, and early received the Christian religion. It was conquered by the Vandals in 430-431 A.D., and recovered by Belisarius for the Byzantine Empire in 533-534. About the middle of the seventh century it was overrun by the Saracens. The town of Algiers was founded about 935 by Yussuf Ibn Zeiri, and the country was subsequently ruled by his successors and the dynasties of the Almoravides and Almohades. After the overthrow of the latter, about 1269, it broke up into a number of small independent territories. The Moors and Jews who were driven out of Spain by Ferdinand and Isabella at the end of the fifteenth century settled in large numbers in Algeria, and revenged themselves on their persecutors by the practice of piracy. On this account various expeditions were made by Spain against Algeria, and by 1510 the greater part of the country was made tributary. A few years later the Algerians invited to their assis-

tance the Turkish pirate Horush (or Haruj) Barbarossa, who made himself Sultan of Algiers in 1516, but was not long in being taken by the Spaniards and beheaded. His brother and successor put Algiers under the protection of Turkey (about 1520), and organized the system of piracy which was long the terror of European commerce, and was never wholly suppressed till the French occupation. Henceforth the country belonged to the Turkish empire, though from 1710 the connection was little more than nominal. The depredations of the Algerian pirates were a continual source of irritation to the Christian powers, who sent a long series of expeditions against them. For instance, in 1815 a United States fleet under Admiral Decatur defeated an Algerian one and forced the dey to agree to a peace in which he recognized the American flag as inviolable. In 1816 Lord Exmouth with an English fleet bombarded Algiers, and exacted a treaty by which all the Christian slaves were at once released, and the dey undertook for the future to treat all his prisoners of war as the European law of nations demanded. But the piratical practices of the Algerians were soon renewed.

At last the French determined on more vigorous measures, and in 1830 sent a force of over 40,000 men against the country. Algiers was speedily occupied, the dey retired, and the country was without a government, but resistance was organized by Abd-el-Kader, an Arab chief whom the emergency had raised up. He began his warlike career of fifteen years by an attack on Oran in 1832, and after an obstinate struggle the French, in February, 1834, consented to a peace acknowledging him as ruling over all the Arab tribes west of the Shelif by the title of Emir of Maskara. War was soon again renewed with varying fortune, and in 1837, in order to have their hands free in attacking Constantine, the French made peace with Abd-el-Kader, leaving to him the whole of Western Algeria except some coast towns. Constantine was now taken, and the subjugation of the province of Constantine followed. Meanwhile Abd-el-Kader was preparing for another conflict, and in November, 1838, he suddenly broke into French territory with a strong force, and for a time the supremacy of the French was endangered. Matters took a more favorable turn for them when General Bugeaud was appointed governor-general in February, 1841. In the autumn of 1841 Saida, the last fortress of Abd-el-Kader, fell into his hands, after which the only region that held out

against the French was that bordering on Morocco. Early in the following year this also was conquered, and Abd-el-Kader found himself compelled to seek refuge in the adjoining empire. From Morocco Abd-el-Kader twice made a descent upon Algeria, on the second occasion defeating the French in two battles; and in 1844 he even succeeded in raising an army in Morocco to withstand the French. Bugeaud, however, crossed the frontier, and inflicted a severe defeat on this army, while a French fleet bombarded the towns on the coast. The Emperor of Morocco was at length compelled to agree to a treaty, in which he not only promised to refuse Abd-el-Kader his assistance, but even engaged to lend his assistance against him. Reduced to extremities, Abd-el-Kader surrendered on 27th December, 1847, and was at first taken to France a prisoner, but was afterwards released on his promise not to return to Algeria. The country was yet far from subdued, and the numerous risings that successively took place rendered Algeria a school for French generals, such as Péliissier, Canrobert, St. Arnaud, and Macmahon. In 1864 Macmahon succeeded Péliissier as governor-general. About this time the emperor Napoleon III, who had visited the colony, introduced considerable modifications into the government. Fresh disturbances broke out in the south nearly every year till 1871, when, during the Franco-German war, a great effort was made to throw off the French yoke. It was, however, completely suppressed, and in order to remove what was believed to be one principal cause of the frequent insurrections a civil government was established instead of the military government in the northern parts of the colony. The southern parts, inhabited by nomadic tribes, are still subject to military rule.

Algesi'ras. See ALGECIRAS.

Alghero, or **ALGHERI** (ál-gá'rō, ál-gá'rē), a fortified town and seaport on the N. W. coast of the island of Sardinia, 15 miles S. W. of Sassari; the seat of a bishop, with a handsome cathedral. Pop. 11,337.

Algiers (al'jērz), a city and seaport on the Mediterranean, capital of Algeria, on the Bay of Algiers, partly on the slope of a hill facing the sea. The old town, which is the higher, is oriental in appearance, with narrow, crooked streets, and houses that are strong, prison-like edifices. The modern French town, which occupies the lower slope and spreads along the shore, is handsomely built, with broad streets and

Algin

elegant squares. It contains the government buildings, the central military and civil establishments, the barracks, the residence of the governor-general and the officials of the general and provincial government, the superior courts of justice, the archbishop's palace and the cathedral, an English church and library, the great commercial establishments, etc. A fine boulevard built on a series of arches, and bordered on one side by handsome buildings, runs along the sea front of the town overlooking the bay, harbor, and shipping. Forty feet below are the quay and railway-station, reached by inclined roads leading from the center of the boulevard. The harbor is good and capacious, and it and the city are defended by a strong series of fortifications. There is a large shipping trade carried on. The climate of Algiers, though extremely variable, makes it a very desirable winter residence for invalids and others from colder regions. Though warm, it is bracing and tonic, and not of a relaxing character. There is a considerable rainfall (average 29 in.), but the dry air and absorbent soil prevent it from being disagreeable. The winter months resemble a bright, sunny English autumn, while the heat of summer is not so intense as that of Egypt. The sirocco or desert wind is troublesome, however, during summer, but in the winter it is merely a pleasant, warm, dry breeze. Hail-storms are not unfrequent, but frost and snow in Algiers are so rare as to be almost unknown. Pop. (1915) 172,394.

Algin (al'jin), a viscous, gummy substance obtained from certain seaweeds, more especially those of the genus *Laminaria*. It can be utilized for all purposes where starch or gum is now required; may be used in cookery for soups and jellies; and in an insoluble form it can be cut, turned, and polished, like horn or vulcanite.

Algoa Bay (al-gō'a), a bay on the south coast of Cape Colony, 425 miles E. from the Cape of Good Hope, the only place of shelter on this coast for vessels during the prevailing northwest gales. The usual anchorage is off Port Elizabeth, on the west coast, now a place of large and increasing trade.

Algol (al-gol'), a star in the constellation Perseus (head of Medusa), remarkable as a variable star, changing in brightness from the second to the fifth magnitude.

Algoa (al-gō'ma), a district of Canada, on the north side of Lake Superior, forming the northwest portion of Ontario, rich in silver, copper, iron,

etc. Area 43,132 sq. miles; pop. about 57,000.

Algonkian (al-gon'ki-) PERIOD, an American geological period between the Archæan and the Cambrian. It is almost anterior to the fossil era, though there are carbonaceous deposits of possible organic origin and a few doubtful fossil indications. These rocks are developed on an enormous scale in the Lake Superior region, and contain deposits of copper and iron.

Algonkins (al-gon'kins), a family of North American Indians, formerly spread over a great extent of territory, and still forming a large proportion of the Indians of Canada. They consisted of four groups, namely—(1) the eastern group, comprising the Massachusetts, Narragansetts, Mohicans, Delawares, and other tribes; (2) the north-eastern group, consisting of the Abenakis, etc.; (3) the western group, made up of the Shawnees, Miamis, Illinois, etc.; and (4) the northwestern group, including the Chippewas or Ojibbewas, the largest of all the tribes.

Alguacil, Alguazil (al-gwá-thēl'), in Spain an officer whose business it is to execute the decree of a judge; a sort of constable.

Algum. See *Almug*.

Alha'gi. See *Camel's-thorn*.

Alhama (al-lá'má; that is, the bath), a town of Southern Spain, province of Granada, on the Motril, 25 miles southwest of Granada, celebrated for its warm medicinal (sulphur) baths and drinking waters. It formed a Moorish fortress, the recovery of which in 1482 by the Spaniards led to the entire conquest of Granada. It was thrown into ruins by an earthquake in Dec., 1884. Pop. 7679. There is also an ALHAMA in the province of Murcia, with a warm mineral spring. Pop. 8461.

Alham'bra (Arabic, *Kelât-al-hamrah*, 'the red castle'), a famous group of buildings in Spain, forming the citadel of Granada when that city was one of the principal seats of the empire of the Moors in Spain, situated on a height, surrounded by a wall flanked by many towers, and having a circuit of 2¼ miles. Within the circuit of the walls are two churches, a number of mean houses, and some straggling gardens, besides the palace of Charles V and the celebrated Moorish palace which is often distinctively spoken of as the Alhambra. This building, to which the celebrity of the site is entirely due, was the royal palace

of the kings of Granada. The greater part of the present building belongs to the first half of the 14th century. It consists mainly of buildings surrounding two oblong courts, the one called the Court of the Fishpond (or of the



Alhambra—Moorish Ornament.

Myrtles), 138 by 74 feet, lying north and south; the other, called the Court of the Lions, from a fountain ornamented with twelve lions in marble, 115 by 68 feet, lying east and west, described as being, with the apartments that surround it, 'the gem of Arabian art in Spain, its most beautiful and most perfect example.' Its design is elaborate, exhibiting a profusion of exquisite detail gorgeous in coloring, but the smallness of its size deprives it of the element of majesty. The peristyle or portico on each side is supported by 128 pillars of white marble, 11 feet high, sometimes placed singly and sometimes in groups. Two pavilions project into the court at each end, the domed roof of one having been lately restored. Some of the finest chambers of the Alhambra open into this court, and near the entrance a museum of Moorish remains has been formed. The prevalence of stucco or plaster ornamentation is one of the features of the Alhambra, which becomes especially remarkable in the beautiful honeycomb stalactital pendentives which the ceilings exhibit. Arabesques and geometrical designs with interwoven inscriptions are present in the richest profusion. See works by Washington Irving, Owen Jones, and J. C. Murphy.

Alhambra, a city of Los Angeles Co., California, 7 miles N.E. of Los Angeles. It is in a fine fruit-growing region and has extensive wineries. It is a health resort, and has increased in population in a decade from 800 to 5021.

Alhaurin (ál-ou-rén'), a town of Southern Spain, 20 miles

W. of Malaga, with sulphur baths. Pop. 8601.

Ali (á'lē), cousin and son-in-law of Mohammed, the first of his converts, and the bravest and most faithful of his adherents, born A.D. 602. He married Fatima, the daughter of the prophet, but after the death of Mohammed (632) his claims to the caliphate were set aside in favor successively of Abu-Bekr, Omar, and Othman. On the assassination of Othman, in A.D. 656, he became caliph, and after a series of struggles with his opponents, including Ayesha, widow of Mohammed, finally lost his life by assassination at Kufa in 661. A Mohammedan schism arose after his death, and has produced two sects. One sect, called the Shiites, put Ali on a level with Mohammed, and do not acknowledge the three caliphs who preceded Ali. They are regarded as heretics by the other sect, called Sunnites. The maxims and hymns of Ali are yet extant. See *Caliph*.

Ali, PASHA OF YANINA, generally called *Ali Pasha*, a bold and able, but ferocious and unscrupulous Albanian, born in 1741, son of an Albanian chief who was deprived of his territories by rapacious neighbors. Ali by his enterprise and success, and by his entire want of scruple, got possession of more than his father had lost, and made himself master of a large part of Albania, including Yanina, which the Porte sanctioned his holding, with the title of pasha. He then as a ruler displayed excellent qualities, putting an end to brigandage and anarchy, making roads, and encouraging commerce. He still farther extended his sway by subduing the brave Suliotes of Epirus, whom he conquered in 1803, after a three years' war. He had long been aiming at independent sovereignty, and had intrigued alternately with England, France, and Russia, and finally became almost independent of the Porte, which at length determined to put an end to his power; and in 1820 Sultan Mahmoud pronounced his deposition. Ali resisted several pashas who were sent to carry out this decision, only surrendering at last in 1822, on receiving assurances that his life and property should be granted him. Faith was not kept with him, however; he was killed, and his head was cut off and conveyed to Constantinople, while his treasures were seized by the Porte.

Alias (á'li-as, Latin, 'on another occasion,' 'otherwise'), a word often used in judicial proceedings in connection with the different names that persons have assumed, most likely for

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prudential reasons at different times, and in order to conceal identity, as Joseph Smith *alias* Thomas Jones.

Aliaska (ä-li-äs'kä), the southwestern peninsula of Alaska Territory, N. America.

Alibert (ä-lä-bär), JEAN LOUIS BABON, a distinguished French physician, born 1766, died 1837, wrote many valuable works on medical subjects.

Ali Bey, a ruler of Egypt, born in the Caucasus in 1728, was taken to Cairo and sold as a slave, but having entered the force of the Mamelukes, and attained the first dignity among them, he succeeded in making himself virtual governor of Egypt. He then refused the customary tribute to the Porte, and coined money in his own name. In 1769 he took advantage of a war in which the Porte was engaged with Russia to endeavor to add Syria and Palestine to his Egyptian dominion, and in this he had almost succeeded, when the defection of his own adopted son, Mohammed Bey, drove him from Egypt. Joining his ally Sheikh Daher in Syria, he still pursued his plans of conquest with remarkable success, till in 1773 he was induced to make the attempt to recover Egypt with insufficient means. In a battle near Cairo his army was completely defeated and he himself taken prisoner, dying a few days afterwards either of his wounds or by poison.

Alibi (al'i-bi, L., 'elsewhere'), a defense in criminal procedure by which the accused endeavors to prove that when the alleged crime was committed he was present in a different place.

Alicante (ä-lä-kän'tä), a fortified town and Mediterranean seaport in Spain, capital of the province of the same name, picturesquely situated partly on the slope of a hill, partly on the plain at the foot, about 80 miles s. by w. of Valencia. The lower town has wide and well-built streets; the upper town is old and irregularly built. The principal manufactures are cotton, linen, and cigars, the government cigar factory employing about 6000 women. The chief export is wine, which largely goes to England. Alicante is an ancient town and in 718 was taken by the Moors, from whom it was recovered about 1240. In modern times it has been several times besieged and bombarded, as by the French in 1700 and in 1812, and by the people of Cartagena during the commotions of 1873. Pop. 50,142.—The province is very fruitful and well cultivated, producing wine, silk, fruits, etc. The wine is of a dark color (hence called *vino tinto*, deep-

colored wine), and is heavy and sweet. Area 2096 sq. miles. Pop. 470,149.

Alicata, or LICATA (ä-lä-kä'tä, lä-kä'tä), the most important commercial town on the s. coast of Sicily, at the mouth of the Salso, 24 miles e. s. e. of Girgenti, with a considerable trade in sulphur, grain, wine, oil, nuts, almonds, and soda. It occupies the site of the town which the Tyrant Phintias of Agragas erected and named after himself, when Gela was destroyed in 280. Pop. 22,031.

Alien (äl'yen), a person born out of the jurisdiction of a country, and not having acquired the full rights of a citizen of it. The position of aliens depends upon the laws of the respective countries, but generally speaking aliens owe a local allegiance, and are bound equally with natives to obey all general rules for the preservation of order which do not relate specially to citizens. Aliens have been often treated with great harshness by the laws of some states. Thus in France there long existed what was known as the *droit d'aubaine*, a law which claimed for the benefit of the state the effects of deceased foreigners leaving no heirs who were natives. Aliens have been repeatedly the objects of legislation in Britain, and the tendency at the present day is to communicate some of the rights of citizenship to aliens, and to widen the definition of subjects. It used to be a principle in English law, that a natural-born subject could not divest himself of his allegiance by becoming naturalized in a foreign state; but it is now laid down that a British subject who has voluntarily become naturalized in a foreign state thereby ceases to be a British subject. In the United States the position of aliens as regards acquisition and holding of real property differs somewhat in the different states, though in recent times the disabilities of aliens have been removed in most of them. They can take, hold, and dispose of personal property like native citizens. Individual states have no jurisdiction on the subject of naturalization, though they may pass laws admitting aliens to any privilege short of citizenship. A naturalized citizen is not eligible to election as president or vice-president of the United States, and cannot serve as senator until after nine years' citizenship, nor as a member of the house of representatives until after seven years' citizenship. Five years' residence in the United States and one year's permanent residence in the particular state where the application is made are necessary for the attainment of citizenship.

Alien and Sedition Laws, French interference in the domestic politics of the United States caused the passage by congress, in 1798, of the Alien law, giving the president power to order aliens, whom he should adjudge dangerous, out of the country, and providing for the fine and imprisonment of those who refused to go. The Sedition law, passed July 14, 1798, to remain in force till March 3, 1801, imposed fine and imprisonment on conspirators to resist government measures, and on libellers and scandalizers of the government, congress, or the president. It was aimed at the newspapers hostile to the Adams administration. Restrictions governing the conduct of enemy aliens in the United States were established on November 19, 1917, by proclamation of President Wilson. It was provided that all enemy aliens must be registered, must obtain government consent to travel or change their occupations, and must report from time to time to federal and municipal officers. Enemy aliens were forbidden approach within prescribed waterfront areas and were expelled from the District of Columbia and the Panama Canal Zone. This ruling applied only to Germans. Upon the declaration of war on Austria-Hungary, subjects of that empire resident in the United States were placed under no such restrictions as in the case of Germans.

Alien Land Law. The passage of the Webb bill in 1913 brought to the fore anew the question of the Japanese on the Pacific coast. It excludes from ownership of land 'aliens ineligible to citizenship,' although as passed, it was amended to admit such aliens to lease lands for agricultural purposes for a term not exceeding three years.

Aligarh (*a-le-gar'*), a fort and city in India, in a district of the same name in the Northwest Provinces, 84 miles southeast of Delhi. The town properly called Koel or Coel, is about 2 miles from the fort. Pop. 70,434.

Aliment (*al'i-ment*), food, a term which includes everything, solid or liquid, serving as nutriment for the bodily system. Aliments are of the most diverse character, but all of them must contain nutritious matter of some kind, which, being extracted by the act of digestion, enters the blood, and effects by assimilation the repair of the body. Alimentary matter, therefore, must be similar to animal substance, or transmutable into such, and must be composed in a greater or less degree of soluble parts, which easily lose their peculiar qualities in the process of digestion, and correspond

to the elements of the body. The food of animals consists for the most part of substances containing little oxygen and exhibiting a high degree of chemical combination, in which respect they differ from most substances that serve as sustenance for plants, which are generally highly oxidized and exhibit little chemical combination. According to the nature of their constituents most of the aliments of animals are divided into nitrogenous (consisting of carbon, hydrogen, and oxygen along with nitrogen, and also of sulphur and phosphorus) and non-nitrogenous (consisting of carbon, hydrogen, and oxygen without nitrogen). Water and salts are usually considered as forming a third group, and, in the widest sense of the word aliment, oxygen alone, which enters the blood in the lungs, forms a fourth. The articles used as food by man do not consist entirely of nutritious substances, but with few exceptions are compounds of various nutritious with indigestible and accordingly innutritious substances. The only nitrogenous aliments are albuminous substances and these are contained largely in animal food (flesh, eggs, milk, cheese). The principal non-nitrogenous substance obtained as food from animals is fat. Sugar is so obtained in smaller quantities (in milk). While some vegetable substances also contain much albumen, very many of them are rich in starch.

The relative importance of the various nutritious substances that are taken into the system and enter the blood depends upon their chemical constitution. The albuminous substances are the most indispensable, inasmuch as they form the material by which the constant waste of the body is repaired, whence they are called by Liebig the substance-formers. They also yield heat, but the maintenance of temperature may be performed by non-nitrogenous substances. As is well known, the temperature of warm-blooded animals is considerably higher than the ordinary temperature of the surrounding air, in man about 98.6° F., and the uniformity of this temperature is maintained by the heat which is set free by the chemical processes (of oxidation) which go on within the body. The best heat-giver is fat. Albuminous matters are not only the tissue-formers of the body; they also supply the vehicle for the oxygen, since this is conveyed through the system by the albuminous blood corpuscles. Only a part of the heat developed passes away into the environment of the animal; another part is transformed within the body (in the muscles) into mechanical work. Hence it follows that the non-nitrogenous articles of food produce not merely heat but also work, but only with

the assistance of the tissue-building and oxygen-bearing albuminous matter. In general, it may be said that that aliment is wholesome which is easily soluble and is suited to the power of digestion of the individual. Man is fitted to derive nourishment alike from animal and vegetable aliment, but can live exclusively on either. The nations of the North incline generally more to animal aliments; those of the South, and the orientals, more to vegetable. The inhabitants of the most northerly regions live almost entirely upon animal food, and very largely on fat on account of its heat-giving property. See *Dietetics, Digestion, Adulteration*, etc.

Alimen'tary Canal, a name signifying the combined œsophagus, stomach, and intestines of animals. See *Æsophagus, Intestine, Stomach*.

Alimony (al'i-mun-i), in law, the allowance to which a woman is entitled while a matrimonial suit is pending between her and her husband, or after a legal separation from her husband, not occasioned by adultery or elopement on her part.

Aliquot Part (al'i-kwot), is such part of a number as will divide and measure it exactly without any remainder. For instance, 2 is an aliquot part of 4, 3 of 12, and 4 of 20.

Alismaceæ (a-lis-mā'se-æ), the waterplantain family, a natural order of endogenous plants, the members of which are herbaceous, annual or perennial; with petiolate leaves sheathing at the base, hermaphrodite (rarely unisexual) flowers, disposed in spikes, panicles, or racemes. They are floating or marsh plants, and many have edible fleshy rhizomes. They are found in all countries, but especially in Europe and North America, where their rather brilliant flowers adorn the pools and streams. The principal genera are *Alisma* (waterplantain) and *Sagittaria* (arrow-head).

Alison (al'i-sun), ARCHIBALD, a theologian and writer on esthetics, born at Edinburgh in 1757; died there in 1839. He studied in Glasgow and at Balliol College, Oxford, entered the English Church, and finally (1800) settled as the minister of an Episcopal chapel at Edinburgh. He published two volumes of sermons, and a work entitled *Essays on the Nature and Principles of Taste* (1790), in which he maintains that all the beauty of material objects depends upon the associations connected with them.

Al'ison, SIR ARCHIBALD, lawyer and writer of history, son of the

above, was born in Shropshire in 1792, and died in 1867, near Glasgow. He was educated at the University of Edinburgh, and in 1814 was admitted to the Scottish bar. He spent the next eight years in continental travel. On his return he was appointed advocate-depute, which post he held till 1830. In 1832 he published *Principles of the Criminal Law of Scotland*, and in 1833 *The Practice of the Criminal Law*. He was appointed sheriff of Lanarkshire in 1834, and retained this post till his death. He was made a baronet in 1852. His chief work—*The History of Europe, from 1789 to 1815*—was first issued in ten vols., 1833-42, the narrative being subsequently brought down to 1852, the beginning of the second French Empire. This work displays industry and research, and is generally accurate, but not very readable. Its popularity, however, has been immense, and it has been translated into French, German, Arabic, Hindustani, etc. Among Sir Archibald's other productions are *Principles of Population; Free Trade and Protection; England in 1815 and 1845; Life of the Duke of Marlborough*, etc.

His son, LIEUT.-GENERAL SIR ARCHIBALD ALISON, born in 1826, entered the army in 1846, and served in the Crimea, in India during the mutiny, and in the Ashantee expedition of 1873-4. In Egypt, in 1882, he led the Highland Brigade at the battle of Tel-el-Kebir, and afterwards was left in command of the British army of occupation, returning home with honors in 1883. Died in 1907.

Aliwal (Al-e-wāl'), a village of Hindustan in the Punjab, on the left bank of the Sutlej, celebrated from the battle fought in its vicinity, January 28, 1846, between the Sikhs and a British army commanded by Sir Harry Smith, resulting in the total defeat of the Sikhs.

Alizarine (a-liz'a-rin), a substance contained in the madder root, and largely used in dyeing reds of various shades. Formerly madder root was largely employed as a dye-stuff, its capability of dyeing being chiefly due to the presence in it of alizarine; but the use of the root has been almost superseded by the employment of alizarine itself, prepared artificially from one of the constituents of coal-tar. It forms yellowish-red prismatic crystals, nearly insoluble in cold, but dissolved to a small extent by boiling water, and readily soluble in alcohol and ether. It possesses exceedingly strong tinctorial powers.

Alkahest (al'ka-hest), the pretended universal solvent or menstruum of the alchemists.

Alkali (from Ar. *al-qaliy*, the ashes of the plant from which soda was first obtained, or the plant itself), a term first used to designate the soluble part of the ashes of plants, especially of sea-weed. Now the term is applied to various classes of chemical bodies having the following properties in common:—(1) solubility in water; (2) the power of neutralizing acids, and forming salts with them; (3) the property of corroding animal and vegetable substances; (4) the property of altering the tint of many coloring matters—thus, they turn litmus, reddened by an acid, into blue; turmeric, brown; and syrup of violets and infusion of red cabbages, green. The alkalis are hydroxides, or water in which half the hydrogen is replaced by a metal or compound radical. In its restricted and common sense the term is applied to six substances only: the hydroxides of potassium, sodium, lithium, cesium, rubidium and ammonium. In a more general sense it is applied to the hydroxides of the metals of the alkaline earths, barium, strontium, calcium and magnesium, and to a large number of organic substances, both natural and artificial, described under *Alkaloid*.—*Volatile alkali* is a name given to ammonia, because of its volatility. *Fixed alkalis* are the non-volatile, stable kind.

Alkali Lands, the name given to certain regions of Montana, Utah and New Mexico, which are marked by the presence of alkali either under ground or crusted on the surface.

Alkalimeter (al-ka-lim'e-tër), an instrument for ascertaining the quantity of free alkali in any impure specimen, as in the potashes of commerce. These, besides the carbonate of potash, of which they principally consist, usually contain a portion of foreign salts, as sulphate and chloride of potassium, and as the true worth of the substance, or price for which it ought to sell, depends entirely on the quantity of carbonate, it is of importance to be able to measure it accurately by some easy process. An instrument devised for the quantitative analysis of carbonated alkali consists essentially of a thin glass vessel which can be weighed on a delicate balance and is so constructed that a known weight of sodium carbonate or acid carbonate is kept from acid contained in another division during the first weighing. The acid is then run onto the carbonate, causing evolution of carbon-dioxide gas, which passes out of the apparatus through concentrated sulphuric acid or over calcium chloride. The apparatus is then weighed a second time. The loss in

weight represents the carbon dioxide evolved and indicates the quality of the carbonate. A process of neutralization, exactly the same in principle, may be employed to test the strength of acids by alkalies, the one process being called *alkalimetry*, the other *acidimetry*.

Alkaloid, a term applied to a class of nitrogenized compounds having certain alkaline properties, found in living plants, and containing their active principles. Their names generally end in *ine*, as *morphine*, *quinine*, *aconitine*, *caffeine*, etc. Most alkaloids occur in plants, but some are formed by decomposition. Their alkaline character depends on the nitrogen they contain. Most natural alkaloids contain carbon, hydrogen, nitrogen, and oxygen, but the greater number of artificial ones want the oxygen. The only property common to all alkaloids is that of combining with acids to form salts, and some exhibit an alkaline reaction with colors. Alkaloids form what is termed the *organio bases* of plants. Although formed originally within the plant, it has been found possible to prepare several of these alkaloids by purely artificial means.

Alkanet, a dyeing drug, the bark of the root of the *Anchusa* or *Boraginacea*, with downy and spear-shaped leaves, and clusters of small purple or reddish flowers. The plant is sometimes cultivated in Britain, but most of the alkanet of commerce is imported from the Levant or from southern France. It imparts a fine deep-red color to all unctuous substances and is used for coloring oils, plasters, lip-salve, confections, etc.; also in compositions for rubbing and giving color to mahogany furniture, and to color spurious port-wine.

Alkanna, a name of henna. See also *Alkanet*.

Alkarsin, an extremely poisonous liquid containing kakodyle, together with oxidation products of this substance, and formerly known as *Cadet's fuming liquor*, characterized by its poisonous, irritating odor and high degree of spontaneous combustibility when exposed to air.

Alkmaar (alk'mär), a town of the Netherlands, prov. of North Holland, on the North Holland Canal, and 20 miles N. N. W. of Amsterdam, regularly built, with a fine church (St. Lawrence) and a richly decorated Gothic town-house; manufactures of salt, sail-cloth, vinegar, leather, etc., and an extensive trade in cattle, corn, butter, and cheese. Po 18,275.

Alkoran. See *Koran*.

Alla breve (brā'vā), a musical direction expressing that a breve is to be played as fast as a semi-breve, a semibreve as fast as a minim, and so on.

Allah (al'a), in Arabic, the name of God, a word of kindred origin with the Hebrew word *Elohim*. **Allah Akbar** (God is great) is a Mohammedan war-cry.

Allahabad (āl-lā-hā-bād'; 'city of Allah'), an ancient city of India, capital of the Northwest Provinces, on the wedge of land formed by the Jumna and the Ganges, largely built of mud houses, though the English quarter has more of a European aspect. Among the remarkable buildings are the fort, and the mausoleum and garden of Khosru, the tomb being a handsome domed building. Allahabad is one of the chief resorts of Hindu pilgrims, and is also the scene of a great fair in December and January. There are no manufactures of importance, but a large general and transit trade is carried on. The town is as old as the third century B.C. In the mutiny of 1857 it was the scene of a serious outbreak and massacre. Population 175,748. —The division of ALLAHABAD contains the districts of Cawnpur, Futtehpur, Hamirpur, Banda, Jhansi, and Allahabad; area, 17,270 square miles; pop. 5,540,702.

Allamanda (al-a-man'da), a genus of American tropical plants, order Apocynaceæ, with large yellow or violet flowers, some of them met with in European green houses. *A. Cathartica* has strong emetic and purgative properties.

Allan (al'lan), DAVID, a Scottish painter, born 1744; died 1796. He studied in Foulis's academy of painting and engraving in Glasgow, and for sixteen years in Italy, finally establishing himself at Edinburgh, where he succeeded Runciman as master of the Trustees' Academy. His illustrations of the *Gentle Shepherd*, the *Cotter's Saturday Night*, etc., obtained for him the name of the 'Scottish Hogarth.'

Allan, GEORGE WILLIAM, a Canadian statesman, born at York, later Toronto, in 1846. He was speaker of the Dominion Senate, 1888-91; was later Chancellor of Trinity University, Toronto; and a member of the King's Privy Council of Canada.

Allan, SIR WILLIAM, a distinguished Scottish artist, born in 1782; died in 1850. He was a fellow-student with Wilkie in Edinburgh, afterwards a student of the Royal Academy, London; then went to St. Petersburg, and remained

for ten years in the Russian dominions. In 1814 he returned to Scotland, and publicly exhibited his pictures, one of which (*Circassian Captives*) made his reputation. He now turned his attention to historical painting, and produced, *Knowlton admonishing Mary Queen of Scots*, *Murder of Rizzio*, *Exiles on their Way to Siberia*, *The Slave Market at Constantinople*, etc.; latterly also battle scenes, as the *Battle of Prestonpans*, *Nelson Boarding the San Nicolas*, and two pictures of the *Battle of Waterloo*, the one from the British, the other from the French position, and delineating the actual scene and the incidents therein taking place at the moment chosen for the representation. One of these Waterloo pictures was purchased by the Duke of Wellington. He traveled extensively, visiting Italy, Greece, Asia Minor, Spain, and Barbary. In 1835 he became R. A., in 1838 president of the Scottish Academy, in 1842 he was knighted.

Allantois (a-lan'tō-is), a structure appearing during the early development of vertebrate animals—reptiles, birds, and mammalia. It is largely made up of blood-vessels, and, especially in birds, attains a large size. It forms the inner lining to the shell, and may thus be viewed as the surface by means of which the respiration of the embryo is carried on. In mammalia the allantois is not so largely developed as in birds, and it enters into the formation of the placenta, the organ by which the embryos both feed and breathe. In man the allantois becomes a ligamentous fragment.

Alleghany (al-le-gā'ni), a river of Pennsylvania and New York, which unites with the Monongahela at Pittsburgh to form the Ohio; navigable nearly 200 miles above Pittsburgh.

Alleghany Mountains, a name sometimes used as synonymous with Appalachians, but also often restricted to the portion of those mountains that traverses the States of Virginia, Maryland, and Pennsylvania from southwest to the northeast, and consists of a series of parallel ridges for the most part wooded to the summit, and with some fertile valleys between. Their mean elevation is about 2500 feet; but in Virginia they rise to over 4000.

Allegheny (al-le-gen'i), or Allegheny City, a former city of Pennsylvania, on the river Alleghany, opposite Pittsburgh, with which it was united by act of the State Legislature in 1906. The principal industries of the twin cities are those connected with iron and machinery. Pop. 145,240.

Allegiance (a-lé'jans; from L. *alligare*, to bind), according to Blackstone, is the tie or *ligament* which binds the subject to the sovereign in return for that protection which the sovereign affords the subject, or, generally, the obedience which every subject or citizen owes to the government of his country. It used to be the doctrine of the English law that natural-born subjects owe an allegiance which is intrinsic and perpetual, and which cannot be divested by any act of their own; but this is no longer the case. Aliens owe a temporary or local allegiance to the government under which they for the time reside. A usurper in undisturbed possession of the crown is entitled to allegiance; and thus treasons against Henry VI were punished in the reign of Edward IV though the former had, by act of Parliament, been declared a usurper.

Allegory (al'e-go-ri), a figurative representation in which the signs (words or forms) signify something besides their literal or direct meaning. In rhetoric allegory is often but a continued simile. Parables and fables are a species of allegory. Sometimes long works are throughout allegorical, as Spenser's *Faerie Queen* and Bunyan's *Pilgrim's Progress*. When an allegory is thus continued it is indispensable to its success that not only the allegorical meaning should be appropriate, but that the story should have an interest of its own in the direct meaning apart from the allegorical signification. Allegory is often made use of in painting and sculpture as well as in literature.

Allegri (ál-lá'gré), GREGORIO, an Italian composer, born at Rome about 1580, died there about 1650; celebrated for his *miscere* music to the fifty-seventh psalm, which in the Latin version begins with that word.

Allegro (Italian ál-lá'gró), a musical term expressing a more or less quick rate of movement, or a piece of music or movement in lively time. *Allegro moderato*, moderately quick; *allegro maestoso*, quick but with dignity; *allegro assai* and *allegro molto*, very quick; *allegro con brio* or *con fuoco*, with fire and energy; *allegroissimo*, with the utmost rapidity.

Alleine (al'en), JOSEPH, English Non-conformist divine; born 1633; died 1668; the author of a popular religious book entitled, *An Alarm to Unconverted Sinners*.

Alleine (al'en), RICHARD, English Non-conformist divine; born in 1611, died 1681; rector for twenty years of Batcombe (Somerset); deprived of his

living at the Restoration, and imprisoned for preaching. He wrote, among other things, *Vindicia Pietatis*, or a *Vindication of Godliness*, which was condemned to be burned in the royal kitchen.

Alleluia. See *Halleluia*.

Allemande (ál-mánd), a kind of slow, graceful dance, invented in France in the time of Louis XIV, and again in vogue in the time of the First Empire.

Allen (al'en), BOG OR, the name applied to a series of bogs in Ireland (not to one continuous morass), dispersed, often widely apart, with extensive tracts of dry cultivated soil between, over a broad belt of land stretching across the center of the country, the bogs being, however, all on the east side of the Shannon.

Allen, ETHAN, an American Revolutionary partisan and general; born 1737, died 1789. He surprised and captured Fort Ticonderoga (1775); attacked Montreal, and was captured and sent to England, being exchanged in 1778.—His younger brother, IRA, was also prominent in the Revolutionary era.

Allen, GRANT, naturalist and novelist, born in Kingston, Canada, in 1848. Was professor of logic and philosophy in Queen's College, Spanish Town, Jamaica, in 1873; principal 1874-77. Wrote *Anglo-Saxon Britain* and a number of works illustrating the principle of evolution in simple and attractive language. In 1884 he became a novelist, writing *Philistia*, *An African Millionaire*, etc. Died in 1899.

Allen, JAMES LANE, novelist, born near Lexington, Kentucky, in 1849; graduated at Transylvania University; became professor of Latin and Higher English at Bethany College, W. Va.; after 1886 engaged in literature. His first story, *John Gray*, afterward extended and republished as *The Choir Invisible*, gave him a high reputation from its depth of thought and insight. Other works are *The Blue Grass Region of Kentucky*; *With Flute and Violin*; *Aftermath*; *A Kentucky Cardinal*; *A Summer in Arcady*, etc.

Allen, JOEL ASAPH, zoölogist, born at Springfield, Massachusetts, in 1838; member of the National Academy of Sciences after 1876; first president American Ornithologists' Union; curator of Mammalogy and Ornithology at American Museum of Natural History after 1885. Author of *History of North American Pinnipeds*; *Monographs of North American Rodentia*, etc.

Allen, JOHN, a Scotch political and historical writer; born in 1771, died in 1843. He studied medicine, and became M. D. of Edinburgh University. In 1801 he went abroad with Lord Holland and family, and henceforth he maintained this connection, being long an inmate of Holland House (London) and a member of the brilliant society there.

Allen, THOMAS, an English mathematician, philosopher, antiquarian, and astrologer, born in 1542, died in 1632. He studied at Oxford, and lived the greater part of his life in learned retirement, corresponding with many of the famous men of his time. In his own day he was generally reputed a dealer in the black art.

Allen, WILLIAM, Cardinal, an English Roman Catholic of the time of Queen Elizabeth, a strenuous opponent of Protestantism and supporter of the claims of Philip II to the English throne; born 1532, died 1594. It was by his efforts that the English college for Catholics at Douay was established. He was made cardinal in 1587. His writings were numerous.

Allen, WILLIAM, an American clergyman and author; born in 1784; died 1868. He was president of Bowdoin College 1820-1839; author of *American Biographical and Historical Dictionary*, a *Supplement to Webster's Dictionary*, *Poems*, etc.

Allenby, Major-General Sir EDMUND HENRY HYNMAN, K. C. B., British soldier, famous as the conqueror of Jerusalem. He was born in 1861 and was educated at Haileybury. He entered the Enniskillen Dragoons and served with that force in the Bechuanaland expedition in 1884-1885, and in Zululand 1888. He was adjutant in the Enniskillen Dragoons from 1889 to 1893 and was twice mentioned in dispatches during the Boer war (1899-1902). He commanded the Fifth Royal Irish Lancers from 1902 to 1905; and the Fourth Cavalry Brigade to 1910. He served in the European war, was mentioned in dispatches and created K. C. B. in 1915 and was given the dignity of Officer of the Legion of Honor. His crowning exploit was the capture of Jerusalem after a brilliant campaign, which began with the investment and capture of the city of Beersheba, near the southern border of Palestine, on October 31, 1917. He led his victorious troops into the sacred city on December 11, 1917.

Allenstein (al'len-stin), a town in East Prussia, 65 miles south of Königsberg, on the Alle, with breweries and manufactures of iron and lucifer matches. Pop. 24,207.

Allentown, a town in the eastern section of Pennsylvania, on the Lehigh river, 18 miles above its junction with the Delaware, 57 miles north of Philadelphia and 30 miles south of the anthracite coal fields. It is the county seat of Lehigh co., an agricultural region, and has many industries, including iron, cement, automobile, silk, furniture, hosiery, clothing, brick, etc. Pop. 65,000.

Alleyn (al'len), EDWARD, an actor and theater proprietor in the reigns of Elizabeth and James I, friend of Jonson and Shakespeare; born 1566, died 1628. Having become wealthy, he built Dulwich College, under the name of 'The College of God's Gift,' in 1613-17. See *Dulwich*.

All-fours, a game at cards, which derives its name from the four chances of which it consists, for each of which a point is scored.

All-hallows, All-hallowmas, a name for All Saints' Day.

Al'ia (now aja or aia), a small affluent of the Tiber, joining it about 12 miles from Rome, famous for the defeat sustained by the Roman army from Brenus and his Gauls, resulting in the capture and sack of Rome, about 390 B.C.

Alliaceus (al-i-á'shus) **PLANTS**, vegetables belonging to the genus *Allium* (order Liliacæ), that to which the onion, leek, garlic, shallot, etc., belong, or to other allied genera, and distinguished by a certain peculiar pungent smell and taste characterized as *alliaceous*. This flavor is also found in a few plants having no botanical affinities with the above, as in the *Alliaria officinalis*, or jack-by-the-hedge, a plant of the order Cruciferae.

Alliance (a-li'ans), a league between two or more powers. **Alliances** are divided into offensive and defensive. The former are for the purpose of attacking a common enemy, and the latter for mutual defense. An alliance often unites both of these conditions. Offensive alliances, of course, are usually directed against some particular enemy; defensive alliances against any one from whom an attack may come.

Alliance, HOLY. See *Holy Alliance*.

Alliance, a city of Stark county, Ohio, 57 miles southeast of Cleveland, and 93 miles N. N. W. of Pittsburgh; seat of Mt. Union College. Manufactures of heavy machinery, steel castings, cash registers, etc. Pop. 15,083.

Allibone (al'i-bôn), SAMUEL AUSTIN, an author and compiler, born at Philadelphia in 1816; died in 1889. He is best known by his notable

work, *A Critical Dictionary of English Literature and British and American Authors*.

Alice, a name of the common shad.

Allier (ál-lè-á), a central department of France, intersected by the river Allier, and partly bounded by the Loire; surface diversified by offsets of the Cevennes and other ranges, rising in the south to over 4000 feet, and in general richly wooded. It has extensive beds of coal as well as other minerals, which are actively worked, there being several flourishing centers of mining and manufacturing enterprise; mineral waters at Vichy, Bourbon, L'Archambault, etc. Large numbers of sheep and cattle are bred. Area 2848 miles. Capital, Moulins. Pop. 422,024. The river Allier flows northward for 200 miles through Lozère, Upper Loire, Puy de Dôme, and Allier, and enters the Loire.

Allies, THE, a name given to the combination of nations which fought against the German-Austrian-Turkish-Bulgarian coalition in the European war. These at first comprised England, France and Russia, among whom had existed a Triple Entente. Italy later joined the Allies in warring against the Central Powers, as did a number of other nations, including the United States.

Alligation (al-i-gā'shun), a rule of arithmetic, chiefly found in the older books, relating to the solution of questions concerning the compounding or mixing together of different ingredients, or ingredients of different qualities or values. Thus if a quantity of sugar worth 8c the lb. and another quantity worth 10c are mixed the question to be solved by alligation is, what is the value of the mixture by the pound.

Alligator (al'i-gā-tur) (a corruption of Sp. *el lagarto*, lit. the lizard—*L. lacertus*), a genus of reptiles of the family Crocodylidae, differing from the true crocodiles in having a shorter and flatter head, in having cavities or pits in the upper jaw, into which the long canine teeth of the under jaw fit, and in having the feet much less webbed. They are confined to the warmer parts of America, where they frequent swamps and marshes, and may be seen basking on the dry ground during the day in the heat of the sun. They are most active during the night, when they make a loud bellying. The largest of these animals grow to the length of 18 or 20 feet. They are covered by a dense armor of horny scales, impenetrable by a rifle-ball, and have a huge mouth, armed with strong, conical teeth. They swim with wonder-

ful celerity, impelled by their long, laterally-compressed, and powerful tails. On land, their motions are proportionally slow and embarrassed because of the length and unwieldiness of their bodies and the shortness of their limbs. They live on fish, and any small animals or carrion, and sometimes catch pigs on the shore or dogs which are swimming. They even sometimes make man their prey. In winter they burrow in the mud of swamps and marshes, lying torpid till the warm weather. The female lays a great number of eggs, which are deposited in the sand or mud, and left to be hatched by the heat of the sun, but the mother alligator is very attentive to her young. The most fierce and dangerous species is that found in the southern parts of the United States (*Alligator Lucius*), having the snout a little turned up, slightly resembling that of the pike. The alligators of South America are there very often called *Caymans*. *A. sclerops* is known also as the *Spectacled Cayman*, from the prominent bony rim surrounding the orbit of each eye. The flesh of the alligator is sometimes eaten. Among the fossils of the south of England are remains of a true alligator (*A. Hantoniensis*) in the Eocene beds of the Hampshire basin.

Alligator-apple (*Anóna palustris*), a fruit allied to the custard-apple, growing in marshy districts in the West Indies, inedible by man, but greedily devoured by alligators.

Alligator-pear (*Persæa gratissima*), an evergreen tree of the natural order Lauraceæ, with a fruit resembling a large pear, 1 to 2 lbs. in weight, with a firm, marrow-like pulp of a delicate flavor; called also avocado-pear, or subaltern's butter. It is a native of tropical America.

Allingham (al'ling-ham), WILLIAM, an English poet, born in Ireland in 1824; died 1889. He was a frequent contributor to periodicals, and for some time edited *Fraser's Magazine*.

Allison (al'i-son), WILLIAM B., born in Perry, Ohio, in 1829; died 1908. He served in Congress as Representative and after 1873 as Senator from Iowa, and was a member of the Monetary Congress at Brussels in 1892.

Alliteration (a-lit-er-ā'shun), the repetition of the same letter at the beginning of two or more words immediately succeeding each other, or at short intervals; as 'many men many minds'; 'death defies the doctor.' 'Apt alliteration's artful aid' Church-hill. 'Puffs, powders, patches, bibles, billet-doux' Pope. In the ancient Ger-

man and Scandinavian and in early English poetry alliteration took the place of terminal rhymes, the alliterative syllables being made to recur with a certain regularity in the same position in successive verses. In the *Vision of William Concerning Piers the Ploughman*, for instance, it is regularly employed as in the following lines:—

Hire robe was ful riche of red scarlet engreyned,
With ribanes of red gold and of riche stones;
Hire arraye me ravyshed such riches saw I
never;

I had wondre what she was and whas wyf she
was.

In the hands of some English poets and prose writers of later times alliteration became a mere conceit. It is still employed in Icelandic poetry, and also in Finnish poetry. So far has alliteration sometimes been carried that long compositions have been written every word of which commenced with the same letter.

Allium (al'i-um), a genus of plants, order Liliaceæ, containing numerous well-known species of pot-herbs. They are umbelliferous, and mostly perennial, herbaceous plants, but a few are biennial. Among them are garlic (*A. sativum*), onion (*A. Cepa*), leek (*A. Porrum*), chive (*A. Schænoprasum*), shallot (*A. acalonicum*). The peculiar alliaceous flavor that belongs to them is well known.

Alloa (al'lo-a), a river port of Scotland, on the north bank of the Forth (where there is now a bridge), 6 miles from Stirling, county of Clackmannan. It carries on brewing, distilling, and ship-building; has manufactures of woollens, bottles, etc., and a considerable shipping trade. Pop. 14,458.

Allocution (al-ô-kû'shun), an address, a term particularly applied to certain addresses on important occasions made by the pope to the cardinals.

Allodium (a-lô'di-um), land held in one's own right, without any feudal obligation to a superior or lord. In England, according to the theory of the British constitution, all land is held of the crown (by *feudal tenure*); the word *allodial* is, therefore, never applied to landed property there.

Allopathy (al-op'a-thi), the name applied by homeopaths to systems of medicine other than their own; Hahnemann's principle, promulgated by Hippocrates centuries before, being that 'like cures like,' he called his own system *homæopathy* (Greek, *homoios*, like; *pathos*, disease) and other systems *allopathy* (Greek, *allos*, other, and *pathos*, disease). See *Homæopathy*.

Allotropy (a-lot'rô-pi; Greek *allos*, other, *tropos*, habit), a term used to express the fact that one and the same element may exist in different forms, differing widely in external physical properties. Thus, carbon occurs as the diamond, and as charcoal and plum-bago, and is therefore regarded as a substance subject to allotropy.

Alloway (al'lo-wā), a parish of Scotland, now included in Ayr parish. Here Burns was born in 1759, and the 'auld haunted kirk,' near his birthplace, was the scene of the dance of witches in *Tam o'Shanter*.

Alloy (a-loi'), a substance produced by melting together two or more metals, excepting mercury, or quicksilver (see *Amalgam*), sometimes a definite chemical compound, but more generally merely a mechanical mixture. Most metals mix together in all proportions, but others unite only in definite proportions, and form true chemical compounds. Others again resist combination, and when fused together form not a homogeneous mixture, but a conglomerate of distinct masses. The changes produced in their physical properties by the combination of metals are very various. Their hardness is in general increased, their malleability and ductility impaired. The color of an alloy may be scarcely different from that of one of its components or it may show traces of neither of two. Its specific gravity is sometimes less than the mean of that of its component metals. Alloys are always more fusible than the metal most difficult to melt that enters into their composition, and generally even more so than the most easily melted one. Newton's fusible metal, composed of three parts of tin, two or five parts of lead, and five or eight parts of bismuth, melts at temperatures varying from 198° to 210° F. (and therefore in boiling water); its components fuse respectively at the temperatures 442°, 600°, and 478° F. Sometimes each metal retains its own fusing-point. With few exceptions metals are not much used in a pure state, this applying to gold and silver coins. Printers' types are made from an alloy of lead and antimony; brass and a numerous list of other alloys are formed from copper and zinc; bronze from copper and tin.

All Saints' Day, a festival of the Christian Church, instituted in 825, and celebrated on the 1st of November in honor of the saints in general.

All Souls' Day, a festival of the Roman Catholic Church, instituted in 998, and observed

on the 2d of November for the relief of souls in purgatory.

Allspice (al'spī), or **PIMENTA**, is the dried berry of a West Indian species of myrtle (*Myrtus Pimenta*), a beautiful tree with white and fragrant aromatic flowers and leaves of a deep shining green. Pimenta is thought to resemble in flavor a mixture of cinnamon, nutmeg, and cloves, whence the popular name of *allspice*; it is also called Jamaica pepper. It is employed in cookery, also in medicine as an agreeable aromatic, and forms the basis of a distilled water, a spirit, and an essential oil.

Allston (al'stun), **WASHINGTON**, an American painter; born 1770, died 1843. He studied in London and Rome, and is most celebrated for his pictures of Scriptural subjects. He also wrote poems and a novelle (*Monaldi*).

Alluvium (a-lu-vi-um; Latin, *alluvium*—ad, to, and luo, to wash), deposits of soil collected by the action of water, such as are found in valleys and plains, consisting of loam, clay, gravel, etc., washed down from the higher grounds. Great alterations are often produced by alluvium—deltas and whole islands being often formed by this cause. Much of the rich land along the banks of rivers is alluvial in its origin. The term is specifically applied to those geological formations that are of recent origin, as during the Pleistocene and Recent periods.

Alma, a small river of Russia, in the Crimea, celebrated from the victory gained by the allied British and French over the Russians, September 20, 1854.

Almacantar (al-ma-kan'tar), a name given to circles of altitude parallel to the horizon, and therefore to an astronomical instrument for determining time and latitude. This consists of a telescope revolving on a horizontal axis, which may be clamped at any altitude, the whole resting on a float in a vessel of mercury. A circle of equal altitude may thus be traced out accurately, and by the transit of stars across

this circle time and latitude can be determined.

Almada (al-mā'dā) a town of Portugal, on the Tagus, opposite Lisbon, has large wine depots. Pop. 7,918.

Almadén (al-mā-den'), a town of Spain, province of Ciudad Real, celebrated both in ancient and modern times for its mines of quicksilver (in the form of cinnabar). Pop. about 7375.

Almaden (al'ma-den), a place in California, about 80 m. S. E. of San Francisco, with rich quicksilver mines, the product of which has been largely employed in gold and silver mining.

Almagest (al'ma-jeſt), the Arabic (semi-Greek) name of a celebrated astronomical work composed by Claudius Ptolemy.

Almagro (al-mā'grō), an old town of Ciudad-Real, Spain (New Castile), with important lace manufactures. Pop. 7,974.

Alma'gro, **DIEGO DE**, Spanish 'Conquistador,' a foundling, born about 1475; killed 1538. He took part with Pizarro in the conquest of Peru, and after frequent disputes with Pizarro about their respective shares in their conquests led an expedition against Chile, which he failed to conquer. On his return a struggle took place between him and Pizarro, in which Almagro was finally overcome, taken prisoner, strangled, and afterwards beheaded. He was avenged by his son, who raised an insurrection in which Pizarro was assassinated in 1541. The younger Almagro was put to death in 1542 by De Castro, the new viceroy of Peru.

Almalee (al-ma-lē'), a town of southwestern Asiatic Turkey, 50 miles from Adalia, with thriving manufactures and a considerable trade. Pop. about 12,000.

Al'ma Ma'ter (L., fostering or bounteous mother), a term familiarly applied to their own university by those who have had a university education.

Al-Mamun (ma-mön'), a caliph of the Abasside dynasty, son of Harun-al-Rashid, born 786, died 833. Under him Bagdad became a great center of art and science.

Almanac (al'ma-nak), a calendar, in which are set down the rising and setting of the sun, the phases of the moon, the most remarkable positions and phenomena of the heavenly bodies, for every month and day of the year; also the several fasts and feasts to be observed in the church and state, etc.,



Alluvial plain of the Mississippi.

and often much miscellaneous information likely to be useful to the public. The term is of Arabic origin, but the Arabs were not the first to use almanacs, which indeed existed from remote ages. They became generally used in Europe within a short time after the invention of printing; and they were very early remarkable, as some are still, for the mixture of truth and falsehood which they contained. Their effects in France were found so mischievous, from the pretended prophecies which they published, that an edict was promulgated by Henry III in 1579 forbidding any predictions to be inserted in them relating to civil affairs, whether those of the state or of private persons. In the reign of James I of England letters-patent were granted to the two universities and the Stationers' Company for an exclusive right of printing almanacs, but in 1775 this monopoly was abolished. During the civil war of Charles I, and thence onwards, English almanacs were conspicuous for the unblushing boldness of their astrological predictions, and their determined perpetuation of popular errors. The most famous English almanac was *Poor Robin's Almanack*, which was published from 1663 to 1828. Still more famous became *Poor Richard's Almanac*, founded by Benjamin Franklin at Philadelphia in 1732, and notable for its homely maxims. Some of the almanacs that are now annually published are extremely useful to men engaged in official, mercantile, literary, or professional business, such as *Whitaker's Almanac*, of England, and the *Almanach de Gotha*, of Germany, which has appeared since 1764 and contains in small bulk a wonderful quantity of information regarding the reigning families and governments, the finances, commerce, population, etc., of the different states throughout the world. The *Nautical Almanack* is an important work published annually by the British government, two or three years in advance, in which is contained much useful astronomical matter, more especially the distances of the moon from the sun and from certain fixed stars, for every three hours of apparent time, adapted to the meridian of the Royal Observatory, Greenwich. The American *Ephemeris and Nautical Almanac*, a similar work, has been issued annually since 1855 by the Bureau of Navigation of the United States, and France and Germany have publications of the same character.

Almansa (äl-män'sä), a town of southeastern Spain (Murcia), near which was fought (April 25, 1707), a

decisive battle in the war of the Spanish succession, when the French, under the Duke of Berwick, defeated the Anglo-Spanish army under the Earl of Galway. Pop. 11,180.

Almanzur, or **ALMANSUR** (äl-män'-sör), caliph of the Abasside dynasty, reigned 754-775. He was cruel and treacherous and a persecutor of the Christians, but a patron of learning.

Alma-Tadema (äl'mä tä'de-mä), LAWRENCE, a Dutch painter, born in 1836, resident since 1870 in England, where he was a naturalized subject. In 1876 he was elected an associate of the Royal Academy, in 1879 an academician; he was also a member of various foreign academies. He is especially celebrated for his pictures of ancient Roman, Greek, and Egyptian life, which are painted with great realism and archaeological correctness. Died in 1912.

Al'meh, the name given in Egypt to a class of girls whose profession is to sing for the public amusement, being engaged to perform at feasts and other entertainments (including funerals). Many of them are skillful improvisatrici.

Almeida (äl-mä'i-dä), one of the strongest fortresses in Portugal, in the province of Beira, near the Spanish border, on the Coa. Pop. 2,300. Taken by Masséna from the English in 1810, retaken by Wellington in 1811.

Almeida, D' (däl-mä'i-dä), FRANCISCO, first Portuguese viceroy of India, son of the Conde de Abrantes, born about the middle of the fifteenth century. He fought with renown against the Moors, and being appointed governor of the new Portuguese settlements on the African and Indian coasts, he sailed for India in 1505, accompanied by his son Lorenzo and other eminent men. In Africa he took possession of Quiloa and Mombas, and in the East he conquered Cananor, Cochin, Calicut, etc., and established forts and factories. His son Lorenzo discovered the Maldives and Madagascar, but perished in an attack made on him by a fleet sent by the Sultan of Egypt, with the aid of the Porte and the Republic of Venice. Having signally defeated the Mussulmans (1508), and avenged his son, and being superseded by Albuquerque, he sailed for Portugal, but was killed in a skirmish on the African coast in 1510.

Almelo (äl-mä-lö'), a town of Holland, prov. Overijssel; with large textile manufactures. Pop. 9,957.

Almería (äl-mä-ré'a), a fortified seaport of southern Spain, capital of prov. Almería, near the mouth of a river and on the gulf of same name,

Almodovar

with no building of consequence except a Gothic cathedral, but with an important trade, exporting lead, esparto, barilla, etc. The province, which has an area of 3,300 sq. miles, is generally mountainous, and rich in minerals. Pop. of town, 47,326; of province, 859,013.

Almodovar (ál-mo-dó'var), a town of Spain, prov. Ciudad-Real (New Castle), near the Sierra Morena. Pop. 12,535.

Almohades (al'mo-hádz), an Arabic or Moorish dynasty that ruled in Africa and Spain in the twelfth and thirteenth centuries, founded by a religious enthusiast. They overthrew the Almoravides in Spain, but themselves received a defeat in 1212 from which they did not recover, and in 1269 were overthrown in Africa.

Al-mokanna. See MOKANNA.

Almond (á'mund), the fruit of the almond tree (*Amygdalus communis*), a tree which grows usually to the height of 20 feet, and is akin to the peach, nectarine, etc., (order Rosaceæ). It has beautiful pinkish flowers that appear before the leaves, which are oval, pointed, and delicately serrated. It is a native



Almond (*Amygdalus communis*).

of Africa and Asia, naturalized in Southern Europe, and cultivated in the northern portions of Europe for its beauty. The fruit is a drupe, ovoid, and with downy outer surface; the fleshy covering is tough and fibrous; it covers the compressed wrinkled stone inclosing the seed or almond within it. There are two varieties, one sweet and the other bitter; both are produced from *A. communis*, though from different varieties. The chief kinds of sweet almonds are the Valencian, Jordan, and Malaga. They contain a bland fixed oil, consisting chiefly of olein. Bitter almonds come from Magador, and besides a fixed oil they contain a substance called *emulsin*, and also a bitter, crystalline substance called *amygdalin*, which, acting on the emulsin, produces prussic acid, whence the aroma of bitter almonds when mixed with water. *Almond-oil*, a bland fixed oil, is expressed from the kernels of either sweet or bitter almonds, and is used by perfumers

and in medicine. A poisonous essential oil is obtained from bitter almonds, which is used for flavoring by cooks and confectioners, also by perfumers and in medicine. The name *almond*, with a qualifying word prefixed, is also given to the seeds of other species of plants; thus, *Jara almonds* are the kernels of *Canarium commune*.

Almondbury (á'mund-be'ri), a town of England, West Riding of Yorkshire, included in the borough of Huddersfield, with manufactures of woolen, cotton and silk goods.

Almoner (al'mo-nér), an officer of a religious establishment to whom belonged the distribution of alms. The grand almoner (*grand aumonier*) of France was the highest ecclesiastical dignitary in that kingdom before the revolution. The lord almoner, or lord high almoner of England, is generally a bishop, whose office is well-nigh a sinecure. He distributes the sovereign's doles to the poor on Maundy Thursday.

Almora (ál-mo'râ) a town and fortress of Hindustan, in the North-west Provinces, capital of Kumaon, 170 miles E. N. E. from Delhi. Pop. about 8000.

Almoravides (al-mo'ra-vidz), a Moorish dynasty which arose in northwestern Africa in the eleventh century, and, having crossed the Straits of Gibraltar, gained possession of all Arabic Spain, but was overthrown by the Almohades in the following century.

Al'mug (or AL'GUM) names of trees, which occur in I Ki., x, 11, 12 and II Chr., ii. 8, and ix. 10, 11 to designate trees of which the wood was used for pillars in the temple and the king's house, for harps and psalteries, etc. They are said in one passage to be hewn in Lebanon, in another to be brought from Ophir. They have been identified by critics with the red sandal-wood of India. Some of them may possibly have been transplanted to Lebanon by the Phœnicians.

Almuñecar (ál-mun-yá'kär), a seaport of Spain, Andalusia, on the Mediterranean. Pop. 8,022.

Al'nager, formerly, in England, an official whose duty it was to inspect, measure, and stamp woolen cloth.

Al'nus. See Alder.

Alnwick (an'ik), a town of England, county town of Northumberland, 34 miles N. from Newcastle, near the Ayn. It is well built, and carries on tanning, brewing, and a general trade. Alnwick Castle, residence of the Dukes

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of Northumberland, for many centuries a fortress of great strength, stands close to the town. Pop. 7041.

Aloe (al'ō), the name of a number of plants belonging to the genus *Aloë* (order Liliaceæ), some of which are not more than a few inches, while others are 30 feet and upwards in height; natives of Africa and other hot regions; leaves fleshy, thick, and more or less spinous at the edges or extremity; flowers with a tubular corolla. Some of the larger kinds are of great use, the fibrous parts of the leaves being made into cordage, fishing nets and lines, cloth, etc. The inspissated juice of several species is used in medicine, under the name of *aloes*, forming a bitter purgative. The principal drug-producing species are the Socotrine aloe (*A. Socotrina*), the Barbadoes aloe (*A. vulgaris*), the Cape aloe (*A. spicata*), etc. A beautiful violet color is afforded by the leaves of the Socotrine aloe. The American aloe (see *Agave*) is a different plant altogether; as are also the aloes or lign-aloës of Scripture, which are supposed to be the *Aquilaria Agallochum*, or aloës-wood (which see). *Aloe fiber* is obtained from species of *Aloë*, *Agave*, *Yucca*, etc., and is made into coarse fabrics, ropes, etc.

Aloes-wood, **EAGLE-WOOD**, or **AGILA-WOOD**, the inner portion of the trunk of *Aquilaria ovata* and *A. Agallochum*, forest trees belonging to the order Aquilariaceæ, found in tropical Asia, and yielding a fragrant resinous substance, which, as well as the wood, is burned for its perfume. Another tree, the *Aloexylon Agallochum* (order Leguminosæ), also produces aloës-wood. This wood is supposed to be the lign-aloës of the Bible.

Alopecia (a-lō-pē'ci-a), a variety of baldness in which the hair falls off from the beard and eyebrows, as well as the scalp.

Alopecurus (a-lō-pē-cū'rus), a genus of grasses. See *Foxtail-grass*.

Alora (ā-lō'rā), a town of Southern Spain, prov. Malaga; pop. 10,525.

Alost, or **AALST** (ā'lost, ālst), a town of Belgium, 15 miles w. n. w. of Brussels, on the Dender (here navigable), with a beautiful church and an ancient town-hall; manufactures of lace, thread, linen and cotton goods, etc., and a considerable trade. Pop. 31,655.

Alaca (al-pak'a), a ruminant mammal of the camel tribe, and *genus* *Auchenia* (*A. pacos*), a native of the Andes, especially of the mountains of

Chile and Peru, and so closely allied to the llama that by some it is regarded rather as a smaller variety than a distinct species. It has been domesticated, and remains also in a wild state. In form and size it approaches the sheep, but has a longer neck. It is valued chiefly for its long, soft and silky wool, which is straighter than that of the sheep, and very strong, and is woven into fabrics of great beauty, used for shawls, clothing for warm climates, coverings, and umbrellas, and known by the same name. Its flesh is pleasant and wholesome.

Alpena (sl-pē'na), a city, county seat of Alpena co., Michigan, on Thunder Bay, 125 miles north of Bay City. It has extensive limestone quarries, and is an important manufacturing city and a summer resort. Pop. 15,000.

Alpen-stock (German), a strong tall stick shod with iron, pointed at the end so as to take hold in, and give support on, ice and other dangerous places in climbing the Alps and other high mountains.

Alpes (ālp), the name of three departments in the southeast of France, all more or less covered by the Alps or their offshoots:—**BASSES-ALPES** (bās-ālp; Lower Alps) has mountains rising to a height of 8,000 to 10,000 feet, is drained by the Durance and its tributaries, and is the most thinly peopled department in France; area, 2,685 miles; capital, Digne, Pop. 113,126. **HAUTES-ALPES** (ōts-ālp; Upper Alps), mainly formed out of ancient Dauphiné, traversed by the Cottian and Dauphiné Alps (highest summits 12,000 ft.), drained chiefly by the Durance and its tributaries. It is the lowest department in France in point of absolute population; area, 2,158 miles; capital, Gap; pop. 107,498.—**ALPES-MARITIMES** (alp-mā-ri-tēm; Maritime Alps) has the Mediterranean on the south, and mainly consists of the territory of Nice, ceded to France by Italy in 1860. The greater part of the surface is covered by the Maritime Alps; the principal river is the Var. It produces in the south, cereals, vines, olives, oranges, citrons, and other fruits; and there are manufactures of perfumes, liqueurs, soap, etc., and valuable fisheries. It is a favorite resort for invalids. Area, 1,442 square miles; capital, Nice, pop. 334,007.

Alpha and Omega (al'fa, ō-mē'ga, or ō'mi-ga), the first and last letters of the Greek alphabet, sometimes used to signify the beginning and the end, or the first and the last of anything; also as a symbol of the Divine Being. They were also formerly the symbol of Christianity, and engraved

accordingly on the tombs of the ancient Christians.

Alphabet (al'fa-bet; from *Alpha* and *Beta*, the first two letters of the Greek alphabet), the series of characters used in writing a language, and intended to represent the sounds of which it consists. The English alphabet, like most of those of modern Europe, is derived directly from the Latin, the Latin from the ancient Greek, and that from the Phœnician, which again is believed to have had its origin in the Egyptian hieroglyphics, the Hebrew alphabet also having the same origin. The names of the letters in Phœnician and Hebrew must have been almost the same, for the Greek names, which, with the letters, were borrowed from the former, differ little from the Hebrew. By means of the names we may trace the process by which the Egyptian characters were transformed into letters by the Phœnicians. Some Egyptian character would, by its form, recall the idea of a house, for example, in Phœnician or Hebrew *beth*. This character would subsequently come to be used wherever the sound *b* occurred. Its form might be afterwards simplified, or even completely modified, but the name would still remain, as *beth* still continues the Hebrew name for *b*, and *beth* the Greek. Our letter *m*, which in Hebrew was called *mim*, water, has still a considerable resemblance to the zigzag wavy line which had been chosen to represent water, as in the zodiacal symbol for *Aquarius*. The letter *o*, of which the Hebrew name means eye, no doubt originally was intended to represent that organ. While the ancient Greek alphabet gave rise to the ordinary Greek alphabet and the Latin, the Greek alphabet of later times furnished elements for the Coptic, the Gothic, and the old Slavic alphabets. The Latin characters are now employed by a great many nations, such as the Italian, the French, the Spanish, the Portuguese, the English, the Dutch, the German, the Hungarian, the Polish, etc., each nation having introduced such modifications or additions as are necessary to express the sound of the language peculiar to it. The Greek alphabet originally possessed only sixteen letters, though the Phœnician had twenty-two. The original Latin alphabet, as it is found in the oldest inscriptions, consisted of twenty-one letters; namely, the vowels *a*, *e*, *i*, *o*, and *u* (*v*), and the consonants *b*, *c*, *d*, *f*, *h*, *k*, *l*, *m*, *n*, *p*, *q*, *r*, *s*, *t*, *z*. The Anglo-Saxon alphabet had two characters for the digraph *th*, which were unfortunately not retained in later English; it had also the character *æ*. It wanted *j*, *v*, *y* (consonant), and *x*. The

German alphabet consists of the same letters as the English, but the sounds of some of them are different. Anciently certain characters called *Runic* were made use of by the Teutonic nations, to which some would attribute an origin independent of the Greek and Latin alphabets. While the alphabets of the west of Europe are derived from the Latin, the Russian, which is very complete, is based on the Greek, with some characters borrowed from the Armenian, etc. Among Asiatic alphabets, the Arabian (originally of Phœnician origin), has played a part analogous to that of the Latin in Europe, the conquests of Mohammedanism having imposed it on the Persian, the Turkish, the Hindustani, etc. The Sanskrit or Devanāgarī alphabet is one of the most remarkable alphabets of the world. As now used it has fourteen characters for the vowels and diphthongs, and thirty-three for the consonants, besides two other symbols. Our alphabet is a very imperfect instrument for what it has to perform, being both defective and redundant. An alphabet is not essential to the writing of a language, since ideograms or symbols may be used instead, as in Chinese. See *Writing*.

Alpheus (al-fē'us), now *Rufia*, the largest river of Peloponnesus, flowing westwards into the Ionian Sea.

Alphonso (al-fon'sō), the name of a number of Portuguese and Spanish kings. Among the former may be mentioned ALPHONSO I, the Conqueror, first King of Portugal, son of Henry of Burgundy, the Conqueror and first Count of Portugal; born 1110, fought successfully against the Spaniards and the Moors, named himself king of Portugal, and was as such recognized by the pope; died 1185.—ALPHONSO V, the African, succeeded his father, Edward I, 1438. Conquered Tangiers; died 1481. During his reign Prince Henry the Navigator continued the important voyages of discovery already begun by the Portuguese. Under him was drawn up an important code of laws.—Among kings of Spain may be mentioned ALPHONSO X, King of Castile and Leon, surnamed the *Astronomer*, the *Philosopher*, or the *Wise*; born in 1226, succeeded in 1252. Being grandson of Philip of Hohenstaufen, son of Frederick Barbarossa, he endeavored to have himself elected Emperor of Germany, and in 1257 succeeded in dividing the election with Richard, Earl of Cornwall. On Richard's death in 1272 he again unsuccessfully contested the imperial crown. Meantime his throne was endangered by conspiracies of the nobles and the attacks of the Moors. The Moors he conquered,

Alpine Crow

but his domestic troubles were less easily overcome, and he was finally dethroned by his son Sancho, and died two years after, 1284. Alphonso was the most learned prince of his age. Under his direction or superintendence were drawn up a celebrated code of laws, valuable astronomical tables which go under his name (*Alphonsine Tables*), the first general history of Spain in the Castilian tongue, and a Spanish translation of the Bible.—ALPHONSO V, of Aragon I of Naples and Sicily, born in 1385, was the son of Ferdinand I of Aragon, the throne of which he ascended in 1416, ruling also over Sicily and the island of Sardinia. Queen Joanna of Naples had promised to make him her heir, but at her death in 1435 had left her dominions to René of Anjou. Alphonso now proceeded to take possession of Naples by force, which he succeeded in doing in 1442, and reigned till his death in 1458. He was an enlightened patron of literary men, by whom, in the latter part of his reign, his court was thronged.—ALPHONSO XII, King of Spain, the only son of Queen Isabella II and her cousin Francis of Assisi, was born in 1857 and died in 1885. He left Spain with his mother when she was driven from the throne by the revolution of 1868, and till 1874 resided partly in France, partly in Austria. In the latter year he studied for a time at the English military college, Sandhurst, being then known as Prince of the Asturias. His mother had given up her claims to the throne in 1870 in his favor, and in 1874 Alphonso came forward himself as claimant, and in the end of the year was proclaimed by General Martinez Campos as king. He now passed over into Spain and was enthusiastically received, most of the Spaniards being by this time tired of the republican government, which had failed to put down the Carlist party. Alphonso was successful in bringing the Carlist struggle to an end (1876), and thenceforth he reigned with little disturbance. He married first his cousin Maria de las Mercedes; second, Maria Christiana, archduchess of Austria.—ALPHONSO XIII, King of Spain, posthumous son of Alphonso XII. He remained under the regency of his mother, Maria Christiana, until May 17, 1902, when he assumed the duties of the throne. He married in 1906 the English princess Victoria Eugenie, niece of Edward VII.

Alpine Crow, *Alpine Cough* (*Pyr-rhocorax alpinus*), a European bird closely akin to the cough of England.

Alpine Plants, the name given to those plants whose

Alps

habitat is in the neighborhood of the snow, on mountains partly covered with it all the year round. As the height of the snow-line varies according to the latitude and local conditions, so also does the height at which these plants grow. The mean height for the alpine plants of Central Europe is about 6000 feet; but it rises in parts of the Alps and in the Pyrenees to 9000, or even more. The high grounds clear of snow among these mountains present a very well marked flora, the general characters of the plants being a low dwarfish habit, a tendency to form thick turfs, stems partly or wholly woody, and large brilliantly-colored and often very sweet-smelling flowers. They are also often closely covered with woolly hairs.

Alpine Tunnels. The fifth tunnel through the Alps, the Loetschberg, in Oberlund, Switzerland, 9¼ miles long, was opened to travel in 1913. Cost nearly \$10,000,000.

Alpine Warbler (*Accentor alpinus*), a European bird of the same genus as the hedge-sparrow.

Alpin'ia, a genus of plants. See *Galangal*.

Alps, the highest and most extensive system of mountains in Europe, included between lat. 44° and 48° N., and lon. 5° and 18° E., occupying much of Northern Italy, several departments of France, nearly the whole of Switzerland, and a large part of Austria, while its extensive ramifications connect it with nearly all the mountain systems of Europe. The culminating peak is Mont Blanc, 15,781 feet high, though the true center is the St. Gothard, or the mountain mass to which it belongs, and from whose slopes flow, either directly or by affluents, the great rivers of Central Europe, the Danube, Rhine, Rhone, and Po. Round the northern frontier of Italy the Alps form a remarkable barrier, shutting it off at all points from the mainland of Europe, so that, as a rule, it can only be approached from France, Germany, or Switzerland, through high and difficult passes. In the west this barrier approaches close to the Mediterranean coast, and near Nice there is left a free passage into the Italian peninsula between the mountains and the sea. From this point eastward the chain proceeds along the coast till it forms a junction with the Apennines. In the opposite direction it proceeds northwest, and afterwards north to Mont Blanc, on the boundaries of France and Italy; it then turns northeast and runs generally in this direction to the Gross Glockner, in Central Tyrol, between the rivers Drave and the Salza.

where it divides into two branches, the northern proceeding northeast towards Vienna, the southern towards the Balkan Peninsula. The principal valleys of the Alps run mainly in a direction nearly parallel with the principal ranges, and therefore east and west. The transverse valleys are commonly shorter, and frequently lead up through a narrow gorge to a depression in the main ridge between two adjacent peaks. These are the passes or *cols*, which may usually be found by tracing a stream which descends from the mountains up to its source.

The Alps in their various great divisions receive different names. The *Maritime Alps*, so called from their proximity to the Mediterranean, extend westward from their junction with the Apennines for a distance of about 100 miles; principal pass, the Col de Tenda (6158 feet), which was made practicable for carriages by Napoleon I. Proceeding northward the next group consists of the *Cottian Alps*, length about 60 miles. Next come the *Graian Alps*, 50 miles long, with extensive ramifications in Savoy and Piedmont. To this group belongs Mont Cenis Pass (6765 feet), over which a carriage road was constructed by Napoleon I, while a railway now passes through the mountain by a tunnel nearly 8 miles long. These three divisions of the Alps are often classed together as the *Western Alps*, while the portion of the system immediately east of this forms the *Central Alps*. The *Pennine Alps* form the loftiest portion of the whole system, having Mont Blanc (in France) at one extremity, and Monte Rosa at the other (60 miles), and including the Alps of Savoy and the Valais. In the east the valley of the upper Rhone separates the Pennine Alps from the great chain of the *Bernese Alps* running nearly parallel, the great peaks of the two ranges being about 20 miles apart. The pass of Great St. Bernard is celebrated for its hospice. The most easterly pass is the Simplon, 6,595 feet, with a carriage road made by Napoleon I. Further east are the *Lepontine Alps*, divided into several groups. From this run northward and southward numerous streams, the latter to the valleys in which lie the lakes Maggiore, Como, etc. The principal pass is the St. Gothard (6,936 feet), over which passes a carriage road to Italy, while through this mountain mass a railway tunnel more than 9 miles long has been opened. Highest peaks: Tödi, 11,887 feet; Monte Leone, 11,696. The *Rhätian Alps*, extending east to about lat. 12° $30'$, are the most easterly of the Central Alps, and are divided into two portions by the Engadine, or valley

of the Inn, and also broken by the valley of the Adige. The Brenner Pass (4,588 feet), from Verona to Innsbruck, and between the Central and the Eastern Alps, is crossed by a railway. On the railway from Innsbruck to the Lake of Constance is the Arlberg Tunnel, over 6 miles long. The *Eastern Alps* form the broadest and lowest portion of the system, and embrace the *Noric Alps*, the *Carnic Alps*, the *Julian Alps*, etc.; highest peak, the Gross Glockner, 12,405 feet. The height of the southeastern continuations of the Alps rapidly diminishes, and they lose themselves in ranges having nothing in common with the great mountain masses which distinguish the center of the system.

The Alps are very rich in lakes and streams. Among the chief of the former are the lakes of Geneva, Constance, Zürich, Thun, Brienz, on the north side; on the south Maggiore, Como, Lugano, Garda, etc. The drainage is carried to the North Sea by the Rhine, to the Mediterranean by the Rhone, to the Adriatic by the Po, to the Black Sea by the Danube.

In the lower valleys of the Alps the mean temperature ranges from 50° to 60° . Half-way up the Alps it averages about 32° —a height which, in the snowy regions, it never reaches. The exhilarating and invigorating nature of the climate in the upper regions during summer has been acknowledged by all. In spite, however, of the generally salubrious climate, the inhabitants of the higher valleys are often afflicted with such diseases as goitre and cretinism.

In respect to vegetation the Alps have been divided into six zones, depending on height modified by exposure and local circumstances. The first is the olive region. This tree flourishes better on sheltered slopes of the mountains than on the plains of Northern Italy. The vine, which bears greater winter cold, distinguishes the second zone. On slopes exposed to the sun it flourishes to a considerable height. The third is called the mountainous region. Cereals and deciduous trees form the distinguished features of its vegetation. The mean temperature about equals that of Great Britain, but the extremes are greater. The fourth region is the sub-Alpine or coniferous. Here are vast forests of pines of various species. Most of the Alpine villages are in the last two regions. On the northern slopes pines grow to 6,000, and on the southern slopes to 7,000 feet above the level of the sea. This is also the region of the lower or permanent pastures where the flocks are fed in winter. The fifth is the pasture region, the term *alp*

Alps

being used in the local sense of high pasture grounds. It extends from the uppermost limit of trees to the region of perpetual snow. Here there are arbutus, rhododendrons, junipers, bilberries, and dwarf willows, etc. The sixth zone is the region of perpetual snow. The line of snow varies, according to seasons and localities, from 8,000 to 9,500 feet, but the line is not continuous, being often broken in upon. From this zone descend the glaciers, the most accessible of these being those of Aletsch, Chamonix, and Zermatt. These feed the Swiss lakes and give rise to the Rhine, Rhone and other rivers. Few flowering plants extend above 10,000 feet, but they have been found as high as 12,000 feet.

At this great elevation are found the wild goat and the chamois. In summer the high mountain pastures are covered with large flocks of cattle, sheep, and goats, which are in winter removed to a lower and warmer level. The marmot, and white or Alpine hare, inhabit both the snowy and the woody regions. Lower down are found the wild cat, fox, lynx, bear, and wolf; the last two are now extremely rare. The vulture, eagle, and other birds of prey frequent the highest elevations, the ptarmigan seeks its food and shelter among the diminutive plants that border upon the snow-line. Excellent trout and other fish are found; but the most elevated lakes are, from their low temperature, entirely destitute of fish.

The geological structure of the Alps is highly involved, and is far, as yet, from being thoroughly investigated or understood. In general three zones can be distinguished, a central, in which crystalline rocks prevail, and two exterior zones, in which sedimentary rocks predominate. The rocks of the central zone consist of granite, gneiss, hornblende, mica slate, and other slates and schists. In the western Alps there are also considerable elevations in the central zone that belong to the Jurassic (Oolite) and Cretaceous formations. From the disposition of the beds, which are broken, tilted, and distorted on a gigantic scale, the Alps appear to have been formed by a succession of disruptions and elevations extending over a very protracted period. Among the minerals that are obtained are iron and lead, gold, silver, copper, zinc, alum, and coal.

For railway purposes the Alps have been pierced by five long tunnels, the Alberg, 6½ miles; the Mont Cenis, 8 miles; the St. Gothard, 9½ miles; the Simplon, 12½ miles, and the Loetschberg, 9¼ miles, opened to travel in 1913.

Alsatia

Alpujarras (al-pū-har-rās), a district of Spain, in Andalusia, between the Sierra Nevada and the Mediterranean, mountainous, but with rich and well-cultivated valleys yielding grain, vines, olives, and other fruits. The inhabitants are Christianized descendants of the Moors.

Alquifou (al'ki-fū), a sort of lead ore used by potters as a green varnish or glaze.

Alsace-Lorraine (al-zās'lor-rān'), a department of El. France, bounded by Luxembourg, the Rhine province of Prussia, and the Rhine Palatinate on the north; Baden on the east; Switzerland on the south; and the French departments of Meurthe-et-Moselle and Vosges on the west. The principal river of Alsace is the Ill, which parallels the course of the Rhine and which has given its name to the country (Illsäss, Elsäss, or Alsace: the country of the Ill). Alsace-Lorraine is very rich in fruits, wines, and cereals; still more important than these is the extensive iron-ore production that was developed while the country was in the hands of Germany, and which proved of great importance to the Germans during the war of 1914-18.

In 1870 the two provinces were wrested from France by Germany and became a part of the German Empire by the law of June 9, 1871. Attempts were made to Germanize the provinces, but these attempts met with little success, and crisis followed crisis. When the great war broke out in 1914 (see *European War*), the French early reoccupied a part of the lost territory, and it was here that American troops made their first appearance in 1917. President Wilson had insisted, as one of the terms of peace, that 'the wrong done to France in 1870 must be righted,' and following the armistice signed November 11, 1918, the Germans retired beyond the Rhine and the French tricolor was raised over Alsace-Lorraine, to the great delight of the inhabitants.

The chief towns are Strasbourg, Colmar, Metz, and Mulhouse. Strasbourg was entered by Marshal Pétain, accompanied by General de Castelnau, on November 25, 1918. Alsace was originally a part of ancient Gaul. It afterward became a dukedom of the German empire. Pop. 1,874,000.

Alsatia (al-sā'shya), formerly a cant name for Whitefriars, a district in London between the Thames and Fleet Street, and adjoining the Temple, which, possessing certain privileges of sanctuary, became for that reason a nest of mischievous characters, who were generally obnoxious to the law. These privileges were abolished in 1697. The name

Alsatia is a Latinized form of Alsace.
Alsberg, CARL L., an American chemist, born in New York City, graduated at Columbia University in 1899. From 1908 till 1912 he held a position in the bureau of plant industry in the United States Department of Agriculture. He was then chosen to succeed Dr. Wiley as chief chemist of the Department of Agriculture. Dr. Alsberg has acquired an international reputation as an authority on the biological phases of chemistry.

Alsen (al'zen), an island of Prussia on the east coast of Schleswig-Holstein; 5 to 7 miles; diversified with forests, lakes, well-cultivated fields, orchards, and towns.

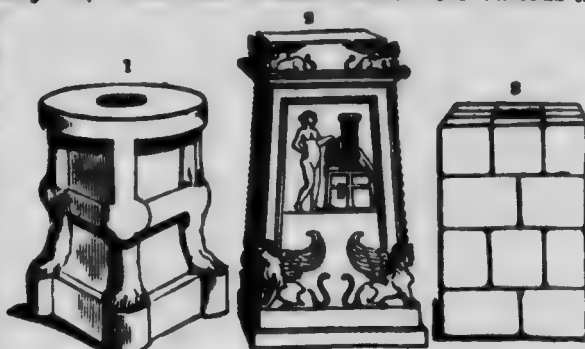
Al Sirat (sə'rat) in Mohammedan belief the bridge extending over the abyss of hell, which must be crossed by every one on his journey to heaven. It is finer than a hair, as sharp as the edge of a sword, and beset with thorns.

Alstroemeria (äls-trē-mē'ri-a), a genus of South American plants, order *marryllidacea*, some of them cultivated in European greenhouses and gardens. *A. Salsilla* and *A. ovata* are cultivated for their edible tubers.

Altai Mountains (äl-ti), an important Asiatic system on the borders of Siberia and Mongolia, partly in Russia and partly in Chinese territory, between lat. 46° and 50° N., lon. 83° and 99° E., but having great eastern extensions. The Russian portion is comprised in the governments of Tomsk and Semipalatinsk, the Chinese in Dsungaria. The rivers in this region are mainly headwaters of the Obi and Irtysh. The highest summit is Byelukha, height 14,890 feet. The area covered by perpetual snow is very considerable, and glaciers occupy a wide extent. In the high lands the winter is very severe: but on the whole the climate is comparatively mild and is also healthy. The mountain forests are composed of birch, alder, aspen, fir, larch, stone-pine, etc. The wild sheep has here its native home, and several kinds of deer occur. The Altai is exceeding rich in minerals, including gold, silver, copper, and iron. The name Altai means 'gold mountain.' The inhabitants are chiefly Russians and Kalmuks. The chief town is Barnaul.

Altamura (äl-tä-mū'rä), a town of South Italy, prov. of Bari, at the foot of the Apennines, walled, well built, and containing a magnificent cathedral. Pop. 22,729.

Altar (al'tar), any pile or structure raised above the ground for receiving sacrifices to some divinity. The Greek and Roman altars were various in



Altars.—1, Assyrian. 2, Grecian. 3, Roman.

form, and often highly ornamental; in temples they were usually placed before the statue of the god. In the Jewish ceremonial the altar held an important place, and was associated with many of the most significant rites of religion. Two altars were erected in the tabernacle in the wilderness, and the same number in the temple, according to instructions given to Moses in Mt. Sinai. These were called the altar of burnt-offering and the altar of incense. In some sections of the Christian church the communion-table, or table on which the eucharist is placed, is called an altar. In the primitive church it was a table of wood, but subsequently stone and metal were introduced with rich ornaments, sculpture, and painting. After the introduction of Gothic art the altar frequently became a lofty and most elaborate structure. Originally there was but one altar in a church, but later there might be several in a large church, the chief or *high altar* standing at the east end. Over an altar there is often a painting (an *altar-piece*), and behind it there may be an ornamental *altar-screen* separating the choir from the east end of the church. Lights are often placed on or near the altar—in English churches they are forbidden to be placed on it.

Altazimuth (alt-az'1-muth; abbrev. of *altitude-azimuth*), a vertical circle with a telescope so arranged as to be capable of being turned round horizontally to any point of the compass, and so differing from a *transit-circle*, which is fixed in the meridian. The altazimuth is brought to bear upon objects by motions affecting their altitude and azimuth. Called also *Altitude-and-azimuth instrument*.

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Altdorf

Altdorf. See *Altorf*.

Altena (äl'tē-nā), a town of Prussia, Westphalia, 40 miles N. N. E. of Cologne; wire-works, rolling-mills, chain-works, manufactories of needles, pins, thimbles, etc. Pop. 12,769.

Altenburg (äl'ten-berg), a town of Germany, capital of Saxe-Altenburg, 23 miles south of Leipzig. It has some fine streets and many handsome edifices, including a splendid palace; manufactures of cigars, woolen yarn, gloves, hats, musical instruments, glass, brushes, etc. Pop. 38,811.

Alteratives (äl'ter-a-tiv), medicines, as mercury, iodine, etc., which, administered in small doses, gradually induce a change in the habit or constitution, and imperceptibly alter disordered secretions and actions, and restore healthy functions without producing any sensible evacuation by perspiration, purging, or vomiting.

Alter ego (äl'ter ē'gō; Latin, 'another I'), a second self, one who represents another in every respect. This term was formerly given, in the official style of the Kingdom of the Two Sicilies, to a substitute, appointed by the king to manage the affairs of the kingdom, with full royal power.

Alternate (al-tér'nāt), in botany, placed on opposite sides of an axis at a different level, as leaves.—*Alternate generation*, the reproduction of young not resembling their parents, but their grandparents, continuously, as in the jelly-fishes, etc. See *Generation*, *Alternate*.

Althæa (al-thē'a) a genus of plants. See *Hollyhock* and *Marsh-mallow*.

Altiscope (äl'ti-sköp), an instrument, consisting of an arrangement of mirrors in a vertical framework, by means of which a person is enabled to overlook an object (a parapet, for instance) intervening between himself and any view that he desires to see, the picture of the latter being reflected from a higher to a lower mirror, where it is seen by the observer.

Altitude (äl'ti-tüd), in mathematics the perpendicular height of the vertex or apex of a plane figure or solid above the base. In astronomy it is the vertical height of any point or body above the horizon. It is measured or estimated by the angle subtended between the object and the plane of the horizon, and may be either *true* or *apparent*. The *apparent* altitude is that which is obtained immediately from observation; the *true* altitude, that which results from

correcting the apparent altitude, by making allowance for parallax, refraction, etc.

Altitude-and-azimuth Instrument. See *Altazimuth*.

Alto (äl'tō), in music, the highest singing voice of a male adult, the lowest of a boy or a woman, being in the latter the same as *contralto*. The alto, or *counter-tenor*, is not a natural voice, but a development of the *falsetto*. It is almost confined to English singers, and the only music written for it is by English composers. It is especially used in cathedral compositions and glees.

Alton (äl'tun), a town of England, in Hampshire, 16 miles N. E. of Winchester, famous for its ale. Pop. 5555.

Alton, a city in Illinois, on the Mississippi, 25 miles north of St. Louis. Has many large industries, making bottles, paper, lead, powder, cartridges, tools, steel, flour, oil products, etc. Stone and sand are plentiful. Pop. 24,000; including factory district, 30,000.

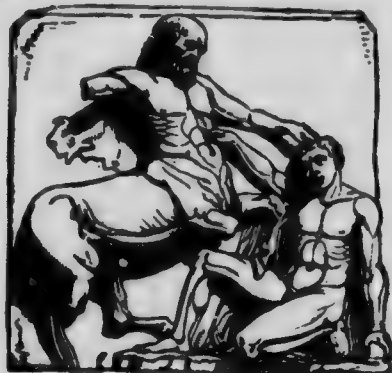
Altona (äl'tō-nā), an important commercial city in the Prussian province of Schleswig-Holstein, on the right bank of the Elbe, adjoining Hamburg, with which it virtually forms one city. It is a free port, and its commerce, both inland and foreign, is large, being quite identified with that of Hamburg. Pop. 172,533.

Altoona (äl'tō-na), a city of Pennsylvania, at the eastern base of the Alleghenies, 244 miles west of Philadelphia, with the large machine-shops and locomotive factories of the Pennsylvania Railroad Company, which cover 150 acres. Also planing mills, silk mills, etc. Pop. 52,127.

Al'torí, a small town of Switzerland, capital of the canton of Uri, beautifully situated, near the Lake of Luzern, amid gardens and orchards, and memorable as the place where, according to legend, Tell shot the apple from his son's head. A colossal statue of Tell now stands here. Pop. 3147.

Alto-rilievo (äl'tō-rē-lē-ä'vo), high relief, a term applied in regard to sculptured figures to express that they stand out boldly from the background, projecting more than half their thickness, without being entirely detached. In *mezzo-rilievo*, or middle relief, the projection is one-half, and in *basso-rilievo*, or bas-relief, less than one-half. Alto-rilievo is further distinguished from *mezzo-rilievo* by some portion of the figures standing usually quite free from the surface on which they are carved,

while in the latter the figures, though rounded, are not detached in any part.



Alto-relievo—Battle of Centaurs and Lapithes.

Altötting (alt-üt'ing), a famous place of pilgrimage, in Bavaria, 52 miles E. N. E. of Munich, near the Inn, where an ancient image of the Madonna is preserved in a chapel dating from 696, and containing a rich treasure in gold and precious stones; and another chapel in which Tilly was buried. Pop. 5408.

Altranstädt (ält'ran-stet), a village of Saxony, where a treaty was concluded between Charles XII, King of Sweden, and Augustus, Elector of Saxony and King of Poland, September 24, 1706, by which the latter resigned the crown of Poland.

Alt'ringham, or ALTRINCHAM, a town of England, in Cheshire, 8 miles S. W. of Manchester; large quantities of fruit and vegetables are raised; and there are several industrial works. Pop. 17,816.

Altruism (al'trü-izm), a term first employed by the French philosopher Comte, to signify devotion to others or to humanity and now in common use; the opposite of *selfishness* or *egoism*.

Altwasser (ält'väs-ér), a town of Prussia, in Silesia, 35 miles S. W. of Breslau; here are made porcelain, machinery, iron, yarn, mirrors, etc. Pop. 12,144.

Al'um, a well-known crystalline astringent substance with a sweetish taste, a double sulphate of potassium and aluminium with a certain quantity of water of crystallization. It crystallizes in regular octahedrons. Its solution reddens vegetable blues. Exposed to heat its water of crystallization is driven off, and it becomes light and spongy with slightly corrosive properties, and is used as a caustic under the name of *burnt alum*. Alum is prepared in Great Britain at

Whitby from alum-slate, where it forms the cliffs for miles, and at Hurlett and Campsie, near Glasgow, from bituminous alum-shale and slate-clay, obtained from old coal-pits. It is also prepared near Rome from alum-stone. Common alum is strictly *potash* alum; other two varieties are *soda* alum and *ammonia* alum, both similar in properties. The importance of alum in the arts is very great, and its annual consumption is immense. It is employed to increase the hardness of tallow, to remove greasiness from printers' cushions and blocks in calico manufactories; in dyeing it is largely used as a mordant. It is also largely used in the composition of crayons, in tannery, and in medicine (as an astringent and styptic). Wood and paper are dipped in a solution of alum to render them less combustible.

Alumbagh (a-lam-bäg'), a palace and connected buildings in Hindustan, about 4 miles south of Lucknow. On the outbreak of the Indian mutiny it was occupied by the revolted Sepoys, and converted into a fort. On the 23d of September, 1857, it was captured by the British, and during the following winter a British garrison, under Sir James Outram, held out here, though repeatedly attacked by overwhelming numbers of the rebels, till in March, 1858, it was finally relieved. Sir Henry Havelock was buried within the grounds.

Alumina (al-ü'mi-na, Al₂O₃), the single oxide of the metal aluminum. As found native it is called bauxite or corundum; when crystallized ruby or Oriental amethyst, topaz and emerald; when amorphous emery. It is next to the diamond in hardness. In combination with silica it is one of the most widely distributed of substances, as it enters in large quantity into the composition of granite, traps, slates, schists, clays, loams, and other rocks. The porcelain clays and kaolins contain about half their weight of this earth, to which they owe their most valuable properties. It has a strong affinity for coloring matters, which causes it to be employed in the preparation of the colors called *lakes* in dyeing and calico-printing. It combines with the acids and forms numerous salts, the most important of which are the sulphate (see *Alum*) and acetate, the latter of extensive use as a mordant.

Aluminum (al-ü'mi-num, symbol Al, atomic weight 27.0), a metal first isolated in 1828, but long very difficult and costly to produce, is now taking place among the common and cheap metals. In 1883 there were only 83 pounds of it produced in the United States, but in a few years later its chief

Alum-root

production by the electrolytic method became available, and in 1910, 80,000,000 pounds were produced. In 1916 the output was 200,000,000 pounds. It is nowhere found native, though as the base of alumina (*q. v.*) it is abundantly distributed. Its chief ore is bauxite, of which the U-ited States produced in 1916, 425,000 long tons, the bulk of it from Oklahoma. It is a shining white metal, of a color between silver and platinum, very light, weighing less than glass, and about one-fourth of silver (specific gravity, 2.58 cast, 2.60 hammered), not liable to tarnish or undergo oxidation in the air, very ductile and malleable, and remarkably sonorous. Its most common use is for kitchen utensils, but other uses are for jewelry, fancy articles, automobile and aeroplane parts, and as a substitute for the more expensive copper. Aluminum plates are used for printing in place of lithographic stones, and thin sheets have replaced tin foil for wrapping purposes.

Alum-root, the name given to two plants of the United States, greatly different, but both having roots of remarkable astringency, which are used for medical purposes. One of these is *Geranium maculatum*; the other is *Heuchera Americana*, a plant of the Saxifrage order. Its root is a powerful styptic and is sometimes employed in medicine to form a wash for wounds and obstinate ulcers.

Alum-shale, **ALUM-SCHIST**, a alaty rock from which much alum is prepared; color grayish, bluish, or iron-black; often possessed of a glossy or shining luster; chiefly composed of clay (silicate of alumina), with variable proportions of sulphide of iron (iron pyrites), lime, bitumen, and magnesia.

Alum-stone, a mineral of a grayish or yellowish-white color, approaching to earthy in its composition, from which (in Italy) is obtained a very pure alum by simply subjecting it to a process of roasting and lixiviation.

Alunno (a-lŭ'nō), **NICCOLO** (real name Niccolò di Liberatore), an Italian painter of the fifteenth century, the founder of the Umbrian School; born in Foligno about 1430; died 1502.

Alva, a town of Scotland, Stirling-shire, 7 miles N. E. of Stirling, in a detached portion of the county, surrounded by Clackmannan and Perth-shire; manufactures of woolen shawls, plaids, etc. Pop. 4332.

Alva, or **ALBA**, **FERDINAND ALVAREZ**, **DUKE OF**, Spanish statesman and general under Charles V and Philip II; was born in 1508; early embraced the military career, and fought in the wars of

Alvarado

Charles V in France, Italy, Africa, Hungary, and Germany. He is more especially remembered for his bloody and tyrannical government of the Netherlands (1567-73), which had revolted, and which he was commissioned by Philip II to reduce to entire subjection to Spain. Among his first proceedings was to establish the 'Council of Blood,' a tribunal which condemned, without discrimination, all whose opinions were suspected and whose riches were coveted. The present and absent, the living and the dead, were subjected to trial and their property confiscated. Many merchants and mechanics emigrated to England; people by hundreds of thousands abandoned their country. The Counts of Egmont and Horn, and other men of rank, were executed, and William and Louis of Orange had to save themselves in Germany. The most oppressive taxes were imposed, and trade was brought completely to a standstill. As a reward for his services to the faith the pope presented him with a consecrated hat and sword, a distinction previously conferred only on princes. Resistance was quelled only for a time, and soon the provinces of Holland and Zealand revolted against his tyranny. A fleet which was fitted out at his command was annihilated, and he was everywhere met with insuperable courage. Hopeless of finally subduing the country he asked to be recalled, and accordingly, in December, 1573, Alva left the country, in which, as he himself boasted, he had executed 18,000 men. He was received with distinction in Madrid, but did not long enjoy his former credit. He had the honor, however, before his death (which took place in 1582) of reducing all Portugal to subjection to his sovereign. It is said of him that during sixty years of warfare he never lost a battle and was never taken by surprise.

Alvarado (ál-vá-rá'dō), **PEDRO DE**, one of the Spanish 'conquistadors,' was born towards the end of the fifteenth century, and died in 1541. Having crossed the Atlantic, he was associated (1519) with Cortez in his expedition to conquer Mexico; and was entrusted with important operations. In July, 1520, during the disastrous retreat from the capital after the death of Montezuma, the perilous command of the rear-guard was assigned to Alvarado. On his return to Spain he was received with honor by Charles V, who made him governor of Guatemala, which he had himself conquered. To this was subsequently added Honduras. He continued to add to the Spanish dominions in America till his death.

Alvarez (al'vá-reth), Don José, a Spanish sculptor; born 1768, died 1827. His works are characterized by truth to nature, dignity and feeling, one of the chief representing a scene in the defense of Saragossa.

Alveolus (al-vé'ô-lus), one of the sockets in which the teeth of mammals are fixed. Hence *alveolar arches*, the parts of the jaws containing these sockets.

Alwar (al-war'), a state of north-western Hindustan, in Rajputana; area, 3,024 square miles; surface generally elevated and rugged, and much of it of an arid description, though water is generally found on the plains by digging a little beneath the surface, and the means of irrigation being thus provided, the soil, though sandy, is highly productive. This semi-independent state has as its ruler a rajah with a revenue of about \$1,000,000; military force, about 5,000 infantry and 2000 cavalry. Pop. (1901) 828,487.—**ALWAR**, the capital, is situated at the base of a rocky hill crowned by a fort, 80 miles s. s. w. of Delhi, surrounded by a moat and rampart, and poorly built, but with fine surroundings; contains the rajah's palace and a few other good buildings. Pop. 56,771.

Alyssum (a-lis'sum), a genus of cruciferous plants, several species of which are cultivated on account of their white or yellow-colored flowers; madwort.

Amad'avat (*Estrilda amandava*), a small Indian singing bird allied to the finches and buntings; sober-colored, often kept in cages.

Amadeus (a-ma-dä'us), the name of several counts of Savoy. The first was the son of Humbert I, and succeeded him in 1048, dying about 1078; others who have occupied an important place in history are the following:—**AMADEUS V**, 'the Great,' succeeded in 1285, gained distinguished honor in defending Rhodes against the Turks, increased his possessions by marriage and war, was made a prince of the empire, died in 1323.—**AMADEUS VIII** succeeded his father, Amadeus VII, in 1391, and had his title raised to that of duke by the Emperor Sigismund. He was chosen regent of Piedmont; but after this elevation retired from his throne and family into a religious house. He now aspired to the papacy, and was chosen by the Council of Basel (1439), becoming pope under the name of Felix V, though he had never taken holy orders. He resigned in 1449, and died in 1451.

Amade'us, Duke of Aosta, second son of Victor Emmanuel

of Italy, and uncle of the present king, was born in 1845, and was chosen by the Cortes King of Spain in 1870, Queen Isabella having had to leave the country in 1868. His position was far from comfortable, however, and perceiving that, as a member of a foreign dynasty, he had little hope of becoming acceptable to all parties in the state, he abdicated in 1873 and returned to Italy. Died 1890.

Amade'us, LAKE, a large salt lake or salt swamp nearly in the center of Australia.

Amadis (am'a-dis), a name belonging to a number of heroes in the romances of chivalry, Amadis de Gaul being the greatest among them, and represented as the progenitor of the whole. The Spanish series of Amadis romances is the oldest. It is comprised in fourteen books, of which the first four narrate the adventures of Amadis de Gaul, this portion of the series having originated about the end of the thirteenth or beginning of the fourteenth century, and the subsequent books being added by various hands. An abridged English translation of Amadis of Gaul was published by Southey in 1803.

Amadou (am'a-dö), a name of several fungi, genus *Polyporus*, of a leathery appearance, growing on trees. See *German Tinder*.

Amager (äm'a-ger), a small Danish island in the Sound, opposite Copenhagen, part of which is situated on it. Pop. 20,000.

Amakosa, one of the Kaffir tribes of S. Africa.

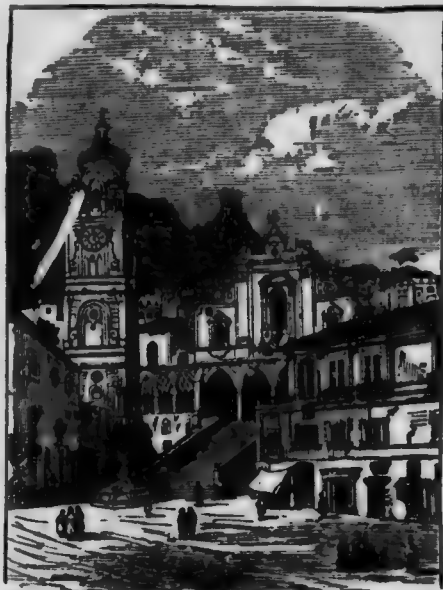
Amalekites (a-mal'e-kits), a Semitic race occupying the peninsula between Egypt and Palestine, named after a grandson of Esau. They were denounced by Moses for their hostility to the Israelites during their journey through the wilderness, and they seem to have been all but exterminated by Saul and David.

Amalfi (ä-mal'fi), a seaport in Southern Italy, on the Gulf of Salerno, 23 miles from Naples, the seat of a bishop; formerly a place of great commercial importance, in the middle ages enjoying a republican constitution of its own. Here arose the *Amalfitan Code* of maritime law. Pop. 7368.

Amalgam (a-mal'gam), a name applied to the alloys of mercury with the other metals. One of them is the amalgam of mercury with tin, which is used to silver looking-glasses. Mercury unites very readily with gold and silver at ordinary temperatures, and advantage is taken of this to separate them from their ores, the process being called amal-

Amanita

gemation. The mercury being properly applied dissolves and combines with the precious metal and separates it from the waste matters, and is itself easily driven off by heat.



The Cathedral, Amalfi.

Amanita (a-ma-ni'ta), a genus of fungi, one species of which *A. muscaria*, or fly-agaric, is extremely poisonous.

Ama'nus, a branch of the Taurus Mountains in Asia Minor.

Amaranthaceæ (am-a-ran-thā'se-ē), the amaranths, a nat. order of apetalous plants, chiefly inhabiting tropical countries, where they are often troublesome weeds. They are remarkable for the white or sometimes reddish scales of which their flowers are composed. *Amaranthus*, the typical genus, comprises *A. caudatus*, or love-lies-bleeding, a common plant in gardens, with pendulous racemes of crimson flowers; and *A. hybridus*, the showy 'princes' feather. The blossoms keep their bloom after being plucked and dried (hence the name: Gr. *a*, not, and *maraincin*, to wither).

Amarapura (a-ma-ra-pō'ra), a deserted city, once the capital of the Burmese Empire, on the left bank of the Irawaddy, 10 miles N. E. of Ava. In 1810 it was completely destroyed by fire, in 1839 it was visited by a destructive earthquake. In 1857 the seat of government was removed to

Amatitlan

Mandalay. The population, now vanished, in 1800 was 175,000.

Amarillo (am-a-ril'lō), a city, capital of Potter Co., Texas, 338 miles N. W. of Fort Worth. It is in a farming and cattle ranching country and is traversed by several railroads. Pop. 9,957.

Amaryllidaceæ (a-ma-ril-i-dā'ce ē), an order of monocotyledonous plants, generally bulbous, occasionally with a tall, cylindrical, woody stem (as in *Agave*); with a highly colored flower, six stamens, and an inferior three-celled ovary; natives of Europe and most of the warmer parts of the world. The order includes the snow-drop, the snow-flake, the daffodil, the belladonna-lily (belonging to the typical genus *Amaryllis*), the so-called Guernsey lily (probably a native of Japan), the *Brunsvigias*, the blood-flowers (*Hemantus*) of the Cape of Good Hope, different species of *Narcissus*, *Agave* (American aloe), etc. Many are highly prized in gardens and hothouses; the bulbs of some are strongly poisonous.

Amasia (a-mā-se'a), a town in north of Asia Minor, on the Ir-mak, 60 miles from the Black Sea, surmounted by a rocky height in which is a ruined fortress; has numerous mosques, richly-endowed Mohammedan schools, and a trade in wine, silk, etc. Amasia was a residence of the ancient kings of Pontus. Pop. 30,000.

Amasis (a-mā'sis), King of Egypt from 569 to 526 B. C., obtained the throne by rebelling against his predecessor Apries, and is chiefly known from his friendship for the Greeks, and his wise government of the kingdom, which, under him, was in the most prosperous condition.

Amati (ä-mä'tē), a family of Cremona who manufactured violins in the sixteenth and seventeenth centuries. Andrea (about 1540-1600) was the founder of the business, which was carried on by his sons Geronimo and Antonio, and by Nicolo the son of Geronimo. Most of the violins made by them are of comparatively small size and flat model, and the tone produced by the fourth or G string is somewhat thin and sharp. Many of Nicolo Amati's violins are, however, of a larger size and have all the fullness and intensity of tone characteristic of those manufactured by Stradivari and Guarneri.

Amatitlán (a-ma-tit'lan), a town in Central America, State of Gautemala, about 15 miles south of the city of Guatemala, a busy modern town, the inhabitants of which are actively

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and this circumstance gave the name to the river.

Amazonas (am-a-zô'nas), the largest province of Brazil, traversed by the Amazon and its tributaries; area, 732,250 sq. miles; pop. abou' 180,000.

Am'azons, according to an ancient Greek tradition, the name of a community of women, who permitted no men to reside among them, fought under the conduct of a queen, and long constituted a formidable State. They were said to burn off the right breast that it might not impede them in the use of the bow—a legend that arose from the Greeks supposing the name was from *a*, not, *mazos*, breast. It is probably from *a*, together, and *mazos*, breast, the name meaning therefore sisters. Several nations of Amazons are mentioned, the most famous being those who dwelt in Pontus, who built Ephesus and other cities. Their queen, Hippolyta, was vanquished by Hercules. They attacked Attica in the time of Theseus. They came to the assistance of Troy under their queen, Penthesilea, who was slain by Achilles.

Amazu'lu, a branch of the Zulu Kafir race. See *Zulus*.

Ambala (am-bal'a), UMBALL'A, a town of India, in the Punjab, in an open plain 3 miles from the Ghaggar, consisting of an old and a new portion, with a flourishing trade in grain and other commodities. The military cantonment is several miles distant. Total pop. 78,638.

Ambalema (am-ba-lh'mâ), a town of S. America, Colombia, on the Magdalena; the center of an important tobacco district. Pop. 8,000.

Ambaree (am'ba-rê), a fiber similar to jute largely used in India, obtained from *Hibiscus cannabinus*.

Ambassador (am-bas'a-dur), a minister of the highest rank, employed by one prince or state at the court of another to manage the public concerns, or support the interests of his own prince or state, and representing the power and dignity of his sovereign or state. Ambassadors are *ordinary* when they reside permanently at a foreign court, or *extraordinary* when they are sent on a special occasion. When *ambassadors extraordinary* have full powers, as of concluding peace, making treaties, and the like, they are called *plenipotentiaries*. Ambassadors are often called simply *ministers*. *Envoys* are ministers employed on special occasions, and are of less dignity than ambassadors. The United States, until 1893, had never sent an agent of the diplomatic rank of am-

bassador. They had been represented by ministers-plenipotentiary. In 'bat year the president was authorized to raise representatives to foreign governments to the rank of ambassador when notified that their representatives to the United States were to be likewise exalted. It now has ambassadors to Great Britain, Germany, France, Austria-Hungary, Italy, Russia, Turkey, Brazil, Mexico and Japan, being represented by ministers in other countries.

Ambatch (*Eschynomene elaphrosylon*), a thorny, leguminous shrub with yellow flowers growing in the shallows of the Upper Nile and other rivers of tropical Africa.

Ambato (âm-bá'tô), a town of Ecuador, on the side of Chimborazo, 70 miles south of Quito. Pop. 10,000.

Am'ber, a semi-mineral substance of resinous composition, a sort of fossil resin, the product of extinct Coniferae. It is usually of yellow or reddish-brown color; brittle; yields easily to the knife; is translucent, and possessed of a resinous luster. Specific gravity, 1.065. It burns with a yellow flame, emitting a pungent, aromatic smoke, and leaving a light, carbonaceous residue, which is employed as the basis of the finest black varnishes. By friction it becomes strongly electric. It is found in masses from the size of coarse sand to that of a man's head, and occurs in beds of bituminous wood situated upon the shores of the Baltic and Adriatic Seas; also in Poland, France, Italy, and Denmark. It is often washed up on the Prussian shores of the Baltic, and is also obtained by fishing for it with nets. Sometimes it is found on the east coast of Britain, in gravel pits round London, also in the United States.

Amberg (âm'berg), a town of south Germany, in Bavaria, on the Vils, well built, with a Gothic church of the fifteenth century, royal palace, town-house, etc.; manufactures of ironwares, stoneware, tobacco, beer, vinegar, and arms. Pop. 22,069.

Ambergris (âm'ber-gris), a substance derived from the intestines of the sperm-whale, and found floating or on the shore; yellowish or blackish white; very light; melts at 140°. and is entirely dissipated on red-hot coals; is soluble in ether, volatile oils, and partially in alcohol, and is chiefly composed of a peculiar fatty substance. Its odor is very agreeable, and hence it is used as a perfume.

Ambidextrous (am-bl-dek's'trus), having the faculty of using the left hand as effectively as the right.

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Ambleteuse (an-bl-tewz), a small seaport of France, 6 miles from Boulogne. Here James II landed on his flight from England in 1688; and from its harbor Napoleon I prepared to despatch a flotilla of flat-bottomed boats for the invasion of Britain.

Amblyopsis (am-bli-op'sis), a genus of blind fishes, containing only one species, *A. spelæus*, found in the Mammoth Cave of Kentucky.

Amblyopy (am'bli-ô-pli), dullness or obscurity of eyesight without any apparent defect in the organs; the first stage of amaurosis.

Am'bo, **Am'bon**, in early Christian churches a kind of raised desk or pulpit, sometimes richly ornamented, from which certain parts of the service were read, or discourses delivered, there being sometimes two in one church.

Amboina. See *Amboyna*.

Amboise (an-bwâz), a town of France, dep. Indre-et-Loire, 12 miles E. of Tours, on the Loire, with an antique castle, the residence of several French kings, and manufactures of files and rasps. Pop. (1906) 4632.

Amboy'na (am-boi'na), **AMBOINA**, or **APON**, one of the Molucca Islands in the Indian Archipelago, close to the large island of Ceram; area, 262 sq. miles. Here is the seat of government of the Dutch residency or province of Amboyna, which includes also Ceram, Booro, etc. Its surface is generally hilly or mountainous, its general aspect beautiful, and its climate on the whole salubrious, but it is not unfrequently visited by earthquakes. It affords a variety of useful trees, including the cocoanut and sago palms. Cloves and nutmegs are the staple productions. The soil in the valleys and along the shores is very fertile, but a large portion remains uncultivated. The natives are mostly of Malayan race. The capital, also called **AMBOYNA**, is situated on the Bay of Amboyna, and is well built and defended by a citadel. The streets are planted on each side with rows of fruit-trees. It is a free port. Pop. 10,500. In 1607 Amboyna and the other Moluccas were taken by the Dutch from the Portuguese, and it was for some years the seat of government of the Dutch East Indies. Trade with the Moluccas was secured to the British by treaty in 1619, but the British establishment was destroyed and several persons massacred in 1623, an outrage for which no satisfaction was obtained till 1654 by Cromwell. Amboyna was taken by the British in 1796 and

1810, but each time restored to the Dutch. Pop. 38,668.

Amboyna Wood, a beautiful curled orange or brownish colored wood brought from the Moluccas, yielded by *Pterocarpus indicus*.

Ambra'cia. See *Arta*.

Am'brose, **SAINT**, a celebrated father of the church; born in A. D. 333 or 334, probably at Treves, where his father was prefect; died in 397. He was educated at Rome, studied law, practised as a pleader at Milan, and in 369 was appointed governor of Liguria and Æmilia (North Italy). His kindness and wisdom gained him the esteem and love of the people, and in 374 he was unanimously called to the bishopric of Milan, though not yet baptized. For a time he refused to accept this dignity, but he had to give way, and at once ranged himself against the Arians. In his struggles against the Arian heresy he was opposed by Justina, mother of Valentinian II and for a time by the young emperor himself, together with the courtiers and the Gothic troops. Backed by the people of Milan, however, he felt strong enough to deny the Arians the use of a single church in the city, although Justina, in her son's name, demanded that two should be given up. He had also to carry on a war with paganism, Symmachus, the prefect of the city, an eloquent orator, having endeavored to restore the worship of heathen deities. In 390, on account of the ruthless massacre at Thessalonica ordered by the emperor Theodosius, he refused him entrance into the church of Milan for eight months. The later years of his life were devoted to the more immediate care of his see. His writings, which are numerous, show that his theological knowledge extended little beyond an acquaintance with the works of the Greek fathers. He wrote Latin hymns, but the *Te Deum Laudamus*, which has been ascribed to him, was written a century later. He introduced the *Ambrosian Chant*, a mode of singing more monotonous than the Gregorian which superseded it. He also compiled a form of ritual known by his name.

Ambrosia (am-brô'zhi-a), in Greek mythology the food of the gods, as nectar was their drink.

Ambrosian Chant. See *Ambrose*.

Ambrosian Library, a public library in Milan founded by the cardinal archbishop Federigo Borromeo, a relation of St. Charles Borromeo, and opened in 1609; now containing 160,000 printed books and many MSS. It was named in honor

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Ambry (am'bri), a niche or recess in the wall of ancient churches near the altar, fitted with a door and used for keeping the sacred utensils, etc.

Ambulacral (am-bū-lā'kral) System, the locomotive apparatus of the Echinodermata (sea-urchins, star-fishes, etc.), the most important feature of which is the protrusible tube-feet that the animals can at will dilate with water and thus move forward.

Ambulance (am'bū-lans), a hospital establishment which accompanies an army in its movements in the field for the purpose of providing assistance and surgical treatment to the soldiers wounded in battle. The name is often given to one of the carts, wagons, or litters used to transfer the wounded from the spot where they fell to the hospital, and also for the ordinary use of city hospitals. One form of ambulance wagon is a strong but light vehicle with an upright frame, from which two stretchers are slung from the top for the accommodation of those most severely wounded; seats before and behind are provided for those suffering from less serious wounds. The hospital chests, containing surgical instruments, bandages, splints, etc., are placed in the bottom of the wagon or lashed to its under surfaces. A thorough ambulance system in connection with armies in the field is quite of recent introduction. A training in ambulance work is now being recognized as of importance beyond the field of military affairs, and as being of the utmost service wherever serious accidents are likely to happen, as, for instance, in connection with large industrial establishments.

Amelanchier (am-el-an'kē-ēr), a genus of small trees natives of Europe and N. America, the Linnean name of the rock-medlar. It has long been cultivated for its showy white flowers; *A. botryadipium* (grape-pear) and *A. ovalis*, American species, yield pleasant fruits.

Ameland (ā'me-lānt), an island off the north coast of Holland, 13 miles long and 3 broad; flat; inhabitants (about 2,000 in number) chiefly engaged in fishing and agriculture.

Amelie-les Bains (a-mā-lē-lā-ban), a health resort of France, dep. Pyrénées Orientales, frequented as a winter residence for invalids, and for its warm, sulphurous springs.

Amen (ā-men'), a Hebrew word, signifying 'verily,' 'truly,' transferred from the religious language

of the Jews to that of the Christians, and used at the end of prayers as equivalent to 'so be it,' 'may this be granted.'

Amendment (a-mend'ment), a proposal brought forward in a meeting of some public or other body, either in order to get an alteration introduced on some proposal already before the meeting, or entirely to overturn such proposal. When amendments are made in either House of Congress upon a bill which passed the other, the bill, as amended, must be sent back to the other House. The Senate may amend money bills passed by the House of Representatives, but cannot originate such bills. Art. V of the Constitution of the United States contains a provision for its amendment.

Amenophis (a-men-ō'fis), or AMENHOTEP III, a king of ancient Egypt about 1500 B. C.; warred successfully against Syrians and Ethiopians, built magnificent temples and palaces at Thebes, where the so-called Memnon statue is a statue of this king.

Amenorrhœa (a-men-ō-rē'a), absence or suspension of menstruation. The former may arise from general debility or from defective development, the latter from exposure to cold, from attacks of fever or other ailment, violent excitement, etc.

Amentaceæ (a-men-tā'se-æ), an order of plants having their flowers arranged in amenta or catkins; formerly considered as forming a natural group, but separated by later botanists into several different families, as *Salicaceæ*, *Myricaceæ*, *Betulaceæ*, *Fagaceæ*, etc.

Amentia (a-men'shi-a), imbecility from birth.

Amentum (a-men'tum), in botany, that kind of inflorescence

which is commonly known as a catkin (as in the birch or willow), consisting of unisexual apetalous flowers in the axil of scales or bracts.

America (a-mer'i-ka), frequently spoken of as the NEW WORLD, the largest of the great divisions of the globe except Asia, is washed on the west by the Pacific, on the east by the Atlantic, on the north by the Arctic Ocean, on the south tapers to a point. On the northwest it approaches



Amentum.

Willow (*Salix fragilis*), male and female, with separate flowers.

within about 50 miles of Asia, while on the northeast the island of Greenland approaches within 370 miles of the European island Iceland; but in the south the distance between the American mainland and Europe or Africa is very great. Extreme points of the continent—north, Boothia Felix, at the Strait of Bellot, lat. 72° N.; south, Cape Horn, lat. 56° S.; west, Cape Prince of Wales, lon. 168° W.; east, Point de Guila, lon. 35° W. America as a whole forms the two triangular continents of North and South America, united by the narrow Isthmus of Panama, and having an entire length of about 10,000 miles; a maximum breadth (in North America) of 3,500 miles; a coast line of 44,000 miles; and a total area, of about 16,500,000, of which N. America contains about 8,700,000 sq. miles. South America is more compact in form than N. America, in this respect resembling Africa, while N. America more resembles Europe. Between the two on the east side is the great basin which comprises the Gulf of Mexico, the Caribbean Sea, and the West India Islands. Like Europe also N. America possesses numerous islands, while those of S. America are less important and confined almost to the southern extremity.

Three-fourths of the area of America is comparatively flat, and this portion of the surface is bounded on the west by lofty mountain systems which stretch continuously from north to south between the extremities of the continent, generally at no great distance from the west shore. In North America the Rocky Mountains, a broad series of masses partly consisting of plateaus, form the most important portion of the elevated surface, being continued southward in the mountains and tableland of Mexico and the ranges of Central America. Separated by depressions from the Rocky Mountains proper, and running close to and parallel with the western coast, are several lofty ranges (Sierra Nevada, Cascade Mountains, etc.). Near the eastern coast, and forming an isolated mass, are the Appalachians, a system of much inferior magnitude. The loftiest mountains in N. America of definitely known elevation are Mts. McKinley, 20,464; Nevado de Toluca, 15,168; Orizaba, 18,314; and St. Elias, 18,026 feet high. The depression of the Isthmus of Panama (about 260 feet) forms a natural separation between the systems of the north and the south. In S. America the Andes form a system of greater elevation but less breadth than the Rocky Mountains and consist of a series of ranges (*cordilleras*) closely following the line of the west coast from the Isthmus of

Panama to Cape Horn. The highest summits seem to be Aconcagua (22,800 feet), Sorata or Illampu (21,484), and Sahama (21,054). Volcanoes are numerous. Isolated mountain groups of minor importance are the highlands of Venezuela and of Brazil, the latter near the eastern coast, reaching a height of 10,000 feet.

The fertile lowlands which lie to the east of the Rocky Mountains and the Andes form a depression extending through both continents from the northern to the southern oceans. They have somewhat different features and different names in different portions; in N. America are *prairies* and *savannahs*, in S. America *llanos*, *selvas*, and *pampas*.

Through these low grounds flow the numerous great rivers which form so characteristic a feature of America. The principal are the Mackenzie, Coppermine, and Great Fish rivers, entering the Northern Ocean; the Churchill, Nelson, Severn, and Albany, entering Hudson Bay; the St. Lawrence, entering the Atlantic; Mississippi and Rio del Norte, entering the Gulf of Mexico (all these being in N. America); the Magdalena, Orinoco, Amazon, Paranaíba, Rio de la Plata, Colorado, and Rio Negro, entering the Atlantic (all in S. America); and the Yukon, Fraser, Colombia, Sar-Joaquin, Sacramento, and Colorado, entering the Pacific. The rivers which flow into the Pacific, however, owing to the fact that the great backbone of the continent, the Rocky Mountains and the Andes, lies so near the west coast, are of comparatively little importance, in S. America being all quite small. Sometimes rivers traversing the same plains, and nearly on the same levels, open communications with each other, a remarkable instance being the Cassiquiare in S. America, which, branching off from the Rio Negro and joining the Orinoco, forms a kind of natural canal, uniting the basins of the Orinoco and the Amazon. The Amazon or Marañon in S. America, the largest river in the world, has a course of about 3,500 miles, and a basin of 2,300,000 square miles; the Mississippi-Missouri, the largest river of North America, runs a longer course than the Amazon, but the area of its basin is not nearly so great. North America has the most extensive group of lakes in the world—Lakes Superior, Michigan, Huron, Erie, and Ontario, which through the St. Lawrence send their drainage to the Atlantic. Thus by means of lakes and rivers the interior of both N. and S. America is opened up and made accessible.

In regard to climate N. America naturally differs very much from S.

America, and has more resemblance to the continents of Europe and Asia (regarded as a whole). In N. America, as in the older continent, the eastern parts are colder than the western, and hence the towns on the Atlantic coast have a winter temperature about 10° lower than those in corresponding latitudes of Europe. The winter temperature of the greater part of N. America is indeed severe, though the intense cold is less felt on account of the dryness of the air. There is no regular season of rainfall unless in the south. Although two-thirds of S. America lies within the tropics the heat is not so great as might be expected, owing to the prevailing winds, the influences of the Andes, and other causes. The highest temperature experienced is probably not more than 100° in the shade; at Rio de Janeiro the mean is about 74°, at Lima 72°. Over great part of S. America there is a wet and a dry season, varying in different regions; on the upper Amazon the rains last for ten months, being caused by the prevailing easterly winds bringing moisture from the Atlantic, which is condensed on the eastern slopes of the Andes. In each of the Americas there is a region in which little or no rain falls; in N. America it extends over the southwestern part of the United States and Northern Mexico, in S. America over a part of the coast region of Peru and Chile.

America is rich in valuable minerals. It has supplied the world with immense quantities of gold and silver, which it still yields in large amount, especially in the United States. It possesses enormous stores of coal (U. States), with an abundance of iron, copper, lead, mercury, etc. Petroleum may be called one of its specialties, its petroleum wells having yielded vast quantities of this useful material and having no rivals except at Baku, Russia.

As regards vegetation America may be called a region of forests and verdure, vast tracts being covered by the grassy prairies, llanos, and pampas where the forests fail. In N. America the forests have been largely made use of by man; in S. America immense areas are covered with forests, which as yet are traversed only by the uncivilized Indian. In the north is the region of pines and firs; farther south come the deciduous trees, as the oak, beech, maple, elm, chestnut, etc. Then follow the evergreen forests of the tropical regions. The useful timber trees are very numerous; among the most characteristic of America are mahogany and other ornamental woods, and various

dyewoods. In the tropical parts are numerous palms, cacti in great variety, and various species of the agave or American aloe. In the virgin forests of S. America the trees are often bound together into an impenetrable mass of vegetation by various kind of climbing and twining plants. Among useful plants belonging to the American continent are maize, the potato, cacao, tobacco, cinchona, vanilla, Paraguay tea, etc. The most important plants introduced are wheat, rice, and other grains, sugar-cane, coffee, and cotton, with various fruits and vegetables. The vine is native to the continent, and both the American and introduced varieties are now largely cultivated.

The distinctive animals of America include, among carnivora, the jaguar or American tiger, found as far north as Texas; the Puma or American lion, found in both Americas; the grizzly bear of N. America, a more powerful animal than either; the black bear, the polar bear, the lynx, the raccoon, the American or prairie wolf, several species of foxes, etc. The rodents are represented by the beaver, the porcupine, and squirrels of several species; the marsupials by the opossum. Among ruminants are the bison, or, as it is commonly called, the buffalo, the moose or elk, the Virginian stag, the musk-ox; and in S. America the llama (which takes the place of the camel of the Old World), the alpaca, and the vicuna. Other animals most distinctive of S. America are sloths, fitted to live only in its dense and boundless forests; ant-eaters and armadillos; monkeys with prehensile tails, in this and other respects differing from those of the Old World; the condor among the heights of the Andes, the nandu, rhea or three-toed ostrich, beautiful parrots and humming-birds. Among American reptiles are the boa-constrictor, the rattlesnake, the alligator or cayman, the iguana and other large lizards, large frogs and toads. The domestic animals of America, horses, cattle, sheep, and swine, are of foreign origin. The electrical eel exists in the tropical waters.

The population of America consists partly of an aboriginal race or races, partly of immigrants or their descendants. The aboriginal inhabitants are the American Indians or red men, being generally of a brownish-red color, and now forming a very small portion of the total population, especially in N. America, where the white population has almost exterminated them. These people are divided into branches, some of which have displayed a considerable aptitude for civilization. When the Europeans became acquainted

with the New World, Mexico, Central and part of S. America were inhabited by populations which had made great advances in many things that pertain to civilised life, dwelling in large and well-built cities under a settled form of government, and practising agriculture and the mechanical arts. Ever since the discovery of America at the close of the fifteenth century Europeans of all nations have crowded into it; and the comparatively feeble native races have rapidly diminished, or lost their distinctive features by intermixtures with whites, and also with negroes brought from Africa to work as slaves. These mixed races are distinguished by a variety of names, as *Mestizos*, *Mulattoes*, *Zambos*, etc. In North America the white population is mainly of British origin, though to a considerable extent it also consists of Germans, Scandinavians, and other Europeans and their descendants. In Central and South America the prevailing white nationality is the Spanish and Portuguese. In the extreme north are the Eskimos—a scattered and stunted race closely allied to some of the peoples of Northern Asia. That the aboriginal inhabitants of America passed over from Asia seems probable, but when and from what part we do not know. The total population of the New World is estimated as being 192,000,000, of which nearly two-thirds are whites, the remainder being negroes, Indians and mixed races. As regards religion the bulk of the population of N. America is Protestant; of Central and S. America the religion is almost exclusively Roman Catholic. Several millions of the Indians are heathens.—The independent States of America are all republican in form of government. See *N., S. and Central America*.

The merit of first unlocking the American continent to modern Europe belongs to the Genoese navigator Christopher Columbus, who discovered, in October, 1492, one of the Bahamas, and named it San Salvador. The coast of North America had, however, been discovered, in the region of New England or Labrador, by the adventurous Northmen, as early as 1000, and named by them Vinland. But this discovery had no influence on the enterprise of Columbus, and did not detract in the least from his merit; forgotten in the north, it had never been known to the inhabitants of the rest of Europe. Though Columbus was the first of his time who set foot on the New World, it has taken its name not from him, but from Amerigo Vespucci. The mainland was first seen in 1497 by Sebastian Cabot, who sailed under the

patronage of Henry VII of England. For further particulars of discovery see *North America* and *South America*.

The known history of America hardly goes beyond the period of its discovery by Columbus; but it possesses many monuments of antiquity that might take us many centuries backward, could we learn anything of their origin or of those by whom they were produced. Among such antiquities are great earthworks in the form of mounds, or of raised enclosures, crowning the tops of hills, river peninsulas, etc., and no doubt serving for defense. They enclose considerable areas, are surrounded by an exterior ditch, and by ramparts which are composed of mingled earth and stones, and are often of great extent in proportion to the area enclosed. They are always supplied either naturally or artificially with water, and give other indications of having been provided for a siege. Barrows and tumuli containing human bones, and which bear indications of having been used both as places of sepulture and as temples, are also numerous. They are in geometrical forms—circles, squares, parallelograms, etc. A mound on the plain of Cahokia in Illinois, opposite the city of St. Louis, is 700 feet long, 500 feet broad, and 90 feet high. Another class of earth mounds represent gigantic animal forms in bas-relief on the ground. One is a man with two heads, the body 50 feet long and 25 feet broad across the breast; another represents a serpent 1,000 feet in length, with graceful curves. The monuments of Mexico, Central America, and Peru belong to a far more advanced state of civilization, approach nearer to the historical period in origin, and make the loss of authentic information more severely felt. Here there are numerous ruined towns with most elaborate sculptures, lofty pyramidal structures serving as temples or forts, statues, picture writing, hieroglyphics, roads, aqueducts, bridges, etc. Some remarkable prehistoric remains are what are known as the abodes of the 'cliff-dwellers.' These consist of habitations constructed on terraces and in caves high up the steep sides of cañons in Colorado and other parts of the western United States. See also *Mexico*, *Peru*, etc.

America Cup, an international yachting trophy which was carried off in a Royal Yacht Squadron Contest by the United States Schooner *America* in 1851, and conveyed by deed of gift in 1857 to the New York Yacht Club. Britain challenged in 1870 and 1871, Canada in 1875 and 1881; and Britain again in 1886, 1887, 1893 and

1895. Sir Thomas Lipton made unsuccessful attempts to gain the trophy with *Shamrock I*, *Shamrock II*, and *Shamrock III* against the *Columbia* in 1899 and 1901 and against the *Reliance* in 1903. Another contest planned for 1914 was postponed by the outbreak of war in Europe.

American Association for the

Advancement of Science, an association based on the older British society for the same purpose. It grew out of the association of American Geologists, which first met at Philadelphia in 1840, and in 1847 adopted the above title. The society meets annually in some American city, the meetings lasting a week. Valuable papers, in every field of science, are read or presented.

Americanism (a-mer'i-kān-izm), a term, phrase, or idiom peculiar to the English language as spoken in America. The following are examples:

Around or round, about or near: To *hang around* is to loiter about a place.

Bee, an assemblage of persons who unite their labors for the benefit of an individual or family, or carry out a joint scheme.

Bogus, false, counterfeit.

Boss, an employer or superintendent of laborers, a leader.

Buggy, a four-wheeled vehicle.

Bulldoze, to; to intimidate voters.

Bunkum or **buncombe**, a speech made solely to please a constituency; talk for talking's sake, and in an inflated style.

Calculate, to suppose, to believe, to think.

Camp-meeting, a meeting held in the fields or woods for religious purposes, and where the assemblages encamp and remain several days.

Cane-brake, a thicket of canes.

Car, a carriage or wagon of a railway train. The Englishman 'travels by rail,' or 'takes the train'; the American takes or goes by the *cars*.

Caucus, a private meeting of the leading politicians of a party to agree upon the plans to be pursued in an approaching election or in a legislative body.

Chalk: a long chalk means a great distance, a good deal.

Clever, good-natured, obliging.

Cocktail, a stimulating drink made of brandy or gin mixed with sugar, and a very little water.

Corn, maize; in England, wheat, or grain in general.

Corn-husking, or **corn-shucking**, an occasion on which a farmer invites his

neighbors to assist him in stripping the husks from his Indian corn.

Cow-hide, a whip made of twisted strips of raw-hide.

Creek, a small river or brook; not, as in England, a small arm of the sea.

Cunning, small and pretty, nice, as it was such a *cunning* baby.

Dander: to get one's *dander raised*, to have one's *dander up*, is to have been worked into a passion.

Dead-heads, people who have free admission to entertainments, or who have the use of public conveyances, or the like, free of charge.

Dépôt, a railway-station.

Down East, in or into the New England States. A *down-easter* is a New Englander.

Drummer, a bagman or commercial traveler.

Dry goods, a general term for such articles as are sold by linen-draper, haberdashers, hosiers, etc.

Dutch, the German language.—*Dutchman*, a German.

Fix, to; to put in order, to prepare, to adjust. To *fix* the hair, the table, the fire, is to dress the hair, lay the table, make up the fire.

Fixings, arrangements, dress, embellishments, luggage, furniture, garnishings of any kind.

Gerrymander, to arrange political divisions so that in an election one party may obtain an advantage over its opponent, even though the latter may possess a majority of votes in the State; from the deviser of such a scheme, named *Gerry*, governor of Massachusetts.

Given name, a Christian name.

Grit, courage, spirit, mettle.

Guess, to; to believe, to suppose, to think, to fancy; also used emphatically, as 'Joe, will you liquor up?' 'I *guess* I will.'

Gulch, a deep abrupt ravine, caused by the action of water.

Happen in, to; to happen to come in or call.

Help, a servant.

High-falutin, inflated speech, bombast.

Hoe-cake, a cake of Indian meal baked on a hoe or before the fire.

Indian summer, the short season of pleasant weather usually occurring about the middle of November.

Johnny cake, a cake made of Indian corn meal mixed with milk or water and sometimes a little stewed pumpkin.

Julep, a drink composed of brandy or whisky with sugar, pounded ice, and some sprigs of mint.

Loafer, a lounge, a vagabond.

Log-rolling, the assembly of several parties of wood-cutters to help one of them in rolling his logs to the river and they are felled and trimmed; also employed in politics to signify a like system of mutual co-operation.

Lot, a piece or division of land, an allotment.

Lumber, timber sawed and split for use; as beams, joists, planks, staves, hoops, etc.

Lynch law, an irregular species of justice executed by the populace or a mob, without legal authority or trial.

Mail letters, to; to post letters.

Make tracks, to; to run away.

Mitten: to get the mitten is to meet with a refusal.

Missle, to; to abscond, or run away.

Mush, a kind of hasty-pudding.

Muss, a state of confusion.

Notions, a term applied to every variety of small-wares.

One-horse: a one-horse thing is a thing of no value or importance, a mean and trifling thing.

Picaninny, a negro child.

Pile, a quantity of money.

Planks, in a political sense, are the several principles which appertain to a party; **platform** is the collection of such principles.

Reckon, to; to suppose, to think.

Rile, to; to irritate, to drive into a passion.

Rock, a stone of any size; a pebble; as to throw rocks at a dog.

Rooster, the common domestic cock.

Scalawag, a scamp, a scapegrace.

Shanty, a mean structure such as squatters erect; a temporary hut.

Skedaddle, to; to run away; a word introduced during the Civil war.

Smart, often used in the sense of considerable, a good deal, as a smart chance.

Soft sawder, flattering, coaxing talk.

Span of horses, two horses as nearly as possible alike, harnessed side by side.

Spread-eagle style, a compound of exaggeration, bombast, mixed metaphor, etc.

Spry, active.

Stampede, the sudden flight of a crowd or number.

Store, a shop, as a bookstore, a grocery store.

Strike oil, to; to come upon petroleum; hence to make a lucky hit, especially financially.

Stump speech, a bombastic speech calculated to please the popular ear, such speeches in newly-settled districts being often delivered from stumps of trees.

Sun-up, sunrise.

Tall, great, fine (used by Shakespeare

pretty much in the same sense); **tall talk** is extravagant talk.

Ticket: to vote the straight ticket is to vote for all the men or measures your party wishes.

Truck, the small produce of gardens; **truck patch**, a plot in which the smaller fruits and vegetables are raised.

Ugly, ill tempered, vicious.

Vamosse, to; to run off (from the Spanish *vamos*, let us go).

Wilt, to; to become languid; lose energy.

American Legion. See *Legion*.

American Philosophical Society, Philadelphia, organized in 1744, for the promotion of useful knowledge, has had enrolled upon its list a membership without a parallel in the history of American societies. At its sesquicentennial, held May 22, 1893, delegates from 40 American and 12 European societies were in attendance, including some of the most distinguished philosophical and scientific thinkers in the world. What this society has accomplished in the last century and a half may be found in the twenty vols. of *Transactions* and the 100 parts of *Proceedings* issued up to the above date and those since issued, forming to a great extent the record of America's scientific progress.

Americus (a-mer'i-kus), capital of Sumter county, Georgia, 64 miles S.E. of Columbus, is an important cotton shipping point and is in a sugar cane and fruit region. It has chemical works and other industries. Pop. 8,063.

Amerigo Vespucci (a-mer-é-go ves-pu't'chē), a maritime discoverer, after whom America was named; born, 1451, at Florence; died, 1512, at Seville. In 1499 he coasted along the continent of America for several hundred leagues, and the publication of his narrative, while the prior discovery of Columbus was yet comparatively a secret, led to the giving of his name to the new continent.

Ames, FISHER, statesman, born at Dedham, Massachusetts, in 1758; died in 1808; studied law, and became prominent in his profession—distinguished as a political orator and essayist.

Amesbury (ámz'bér-e), in Massachusetts, 42 miles N. of Boston; has automobile and carriage manufactures, shoe factories, etc. Pop. 9894.

Amethyst (am'e-thist), a violet-blue or purple variety of quartz, generally occurring crystallized in hexahedral prisms or pyramids, also in rolled fragments composed of imperfect

Amhara

prismatic crystals. It is wrought into various articles of jewelry. The *oriental emethyst* is a rare violet-colored gem, a variety of alumina or corundum, of much brilliance and beauty.

Amhara (ám-há-rá), a district of Abyssinia, lying between the Tacazzé and the Blue Nile.

Amherst (am'erst) a village in Massachusetts, 97 miles w. of Boston, on the Boston and Maine and Vermont Central railroads. Here are Amherst College (founded in 1821; library, 100,000 volumes; productive funds, \$3,800,000; number of students in the fall of 1918, 414), and Massachusetts Agricultural College (opened 1867; instruction free to residents of state; 550 students). Pop. 5300.

Amherst, seaport town, capital of Cumberland co., Nova Scotia; a shipbuilding center, with lumber trade and many industries. Pop. 11,000.

Amherst, JEFFERY, LORD, born in 1717, died in 1797; distinguished British general, who fought at Dettingen and Fontenoy, and commanded in America, where he took Louisburg, Ticonderoga, and Quebec, and restored the British prestige in Canada. He was commander-in-chief in America, 1760-63, and afterwards Governor of Virginia. He was raised to the peerage, became commander-in-chief of the British armies, and ultimately field-marshal.

Amherst, WILLIAM PITT, first earl, nephew of the above; Governor-general of India, 1823; prosecuted the first Burmese war, and suppressed the Barrackpore mutiny. Born in 1773, died in 1857.

Amianthus (am-i-an'thus), a kind of flexible asbestos. See *Asbestos*.

Amice (am'is), an oblong piece of linen with an embroidered apparel sewed upon it, worn under the alb by priests of the Roman Catholic Church when engaged in the service of the mass.

Amicis, Edmondo de (dā-ā-mē-chēs), an Italian author, born at Oneglia in 1846. He studied at Cuneo, Turin and Modena; entered the Italian army and took part in the battle of Custoza, but left the service after the occupation of Rome and engaged in literature. He wrote racy and readable sketches of travel in Holland and other countries, also *La Vita Militare*, *Novelle* and *Ritratti*. Died March 11, 1908.

Amide, Amine (am'id, am'in), names given to a series of salts produced by the substitution of elements or radicals for the

hydrogen atoms of ammonia; often used as terminations of the names of such salts. When these hydrogen atoms are replaced by acid radicals, the salts are called *amides*, while if the replacing radicals are basic, the salts are termed *amines*.

Amiens (ā-mē-an), a town of France, capital of the department of Somme, on the railway from Boulogne to Paris. It has a citadel, wide and regular streets, and several large open areas; a cathedral, one of the largest and finest Gothic buildings in Europe, founded in 1220. Having water communication with the sea by the Somme, which is navigable for small vessels, it has a large trade in cottons and woollens. The city was occupied temporarily by the Germans in their first advance on Paris in the European war (q. v.), Aug. 30, 1914, but were compelled to retire. In the last desperate offensive of the Germans in the spring of 1918 they menaced Amiens, but were unable to capture it. Pop. 78,407.

Amine (am'en), a compound of ammonia in which one or more atoms of hydrogen are replaced by base radicals. Thus is formed a series of amines, potassamine, ethylamine, etc.

Amirante Islands (ā-mē-rān'tā), a group of eleven small islands in the Indian Ocean, lying southwest of the Seychelles, and forming a dependency of Mauritius.

Amish Church, THE. See *Mennonites*.

Amistad Case (ā-mēs-tāth), a celebrated case before the United States Supreme Court in 1841. It involved the legal status of certain forcibly enslaved negroes, who by revolt had secured possession of the Spanish schooner *L'Amistad* while being transported from Havana to Puerto Principe. They landed in the United States, and the Spanish government demanded their surrender, but the demand was resisted by popular feeling in this country. The United States Circuit Court decided that the negroes had been legally justified in obtaining their freedom, and this decision was sustained by the Supreme Court.

Ammergau (am'er-gou), a district in Upper Bavaria, having its center in the villages of Ober and Unter Ammergau. See *Passion Play*.

Ammianus (am-mi-ā'nus), MARCEL-LINUS, a Roman historian, born at Antioch in Syria about 320, died about 390. He wrote in thirty-one books (of which the first thirteen are lost) a history of the Caesars, from Nerva to Valens, which was highly thought of by Gibbon for its fidelity. He was the last Latin historian of the Roman Empire.

Ammon

Am'mon, an ancient Egyptian deity, one of the chief gods of the country, identified by the Greeks with their supreme god Zeus, while the Romans regarded him as the representative of Jupiter; represented as a ram, as a human being with a ram's head, or simply with the horns of a ram. There was a celebrated Temple of Ammon in the Oasis of Siwah in the Libyan desert.

Ammon, OASIS

SIWAH.

Ammonia (am-mō'nī-a), an alkaline substance, which differs from the other alkalies by being gaseous, and is hence sometimes called the *volatile alkali*. It is a colorless, pungent gas, composed of nitrogen and hydrogen. It was first procured in that state by Priestley, who termed it *alkaline air*. He obtained it from sal ammoniac by the action of lime, by which method it is yet generally prepared. It is used for many purposes, both in medicine and scientific chemistry; not, however, in the gaseous state, but frequently in solution in water, under the names of *liquid ammonia*, *ammonium hydroxide*, or *spirits of hartshorn*. It may be procured naturally from putrescent animal substances; artificially it is chiefly got from the distillation of coal and of refuse animal substances, such as bones, clippings and shavings of horn, hoof, etc. It may also be obtained from vegetable matter when nitrogen is one of its elements. Sal ammoniac is the chloride of ammonium, and was first obtained at the Temple of Ammon by distillation of camels' dung, whence the name ammonia.

Ammoniacum (a-mō-nī'a-kum), a gum-resinous exudation from an umbelliferous plant, the *Dorema ammoniacum*. It has a fetid smell, is inflammable, soluble in water and spirit of wine; used as an antispasmodic, stimulant, and expectorant in chronic catarrh, bronchitic affections, and asthma; also used for plasters.

Ammonite (am'on-it), a fossil Cephalopod, belonging to the genus *Ammonites*, allied to the Nautilus, having a many-chambered shell, in shape like the curved horns on the ancient statues of Jupiter Ammon; char-



Ammon.

acteristic of the Trias, Lias, and Oolite formations, and sometimes found in immense numbers and of great size.



Ammonites obtusus. *Ammonites varians.*

Ammonites (am'on-its), a Semitic race frequently mentioned in Scripture, descended from Ben Ammi, the son of Lot (Gen., xix, 38), often spoken of in conjunction with the Moabites. A predatory nomad race they inhabited the desert country east of Gad, their chief city being Rabbath-Ammon (Philadelphia). Wars between the Israelites and the Ammonites were frequent; they were overcome by Jephthah, Saul, David, Uzziah, Jotham, etc. They appear to have existed as a distinct people in the time of Justin Martyr, but have subsequently become merged in the aggregate of nameless Arab tribes.

Ammonium (a-m-mō'nī-um), the name given to the hypothetical base of ammonia, analogous to an alkali metal, as potassium. It has not been isolated, but may exist in an unstable amalgam with mercury.

Ammonius Sac'cas, a Greek philosopher who lived about A.D. 175-250. Originally a porter in Alexandria, he derived his epithet from the carrying of *sacks* of corn. The son of Christian parents, he abandoned their faith for the polytheistic philosophy of Greece. His teaching was historically a transition stage between Platonism and Neo-Platonism. Among his disciples were Plotinus, Longinus, Origen, etc.

Ammunition (am-ū-nī'shun), military stores generally.

Amnesty (am'nes-ti), the releasing of a number of persons who have been guilty of political offenses from the consequence of these offenses. In the absence of specific statutes the exercise of amnesty in the United States is assumed to lie with the President, though the Supreme Court has decided that the power resides also in Congress.

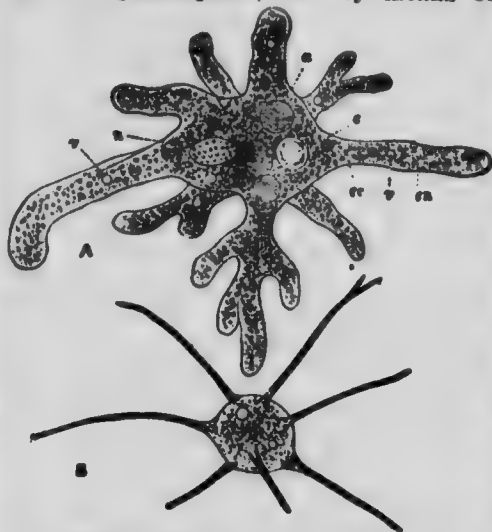
Amnesty Proclamations. During the war that followed the secession of the Southern States, four important amnesty proc-

Amnion

lamations were issued: one by President Lincoln in 1863, and three by President Johnson, one in 1865 and two in 1868.

Amnion (am'ni-on), the innermost membrane surrounding the fetus of mammals, birds, and reptiles.—In botany, a gelatinous fluid in which the embryo of a seed is suspended, and by which it is supposed to be nourished.

Amœba (a-mœ'ba), a genus of microscopic rhizopodous Protozoan, of which *A. diffüens*, common in fresh-water ponds and ditches, is the type. It exists as a mass of protoplasm, and pushes its body out into finger-like processes or pseudopodia, and by means of



A. Amoeba proteus, with the pseudopodia protruded, enlarged; **n**, Nucleus; **c**, Contractile vesicle; **v**, One of the larger food-vacuoles; **en**, The granular endosarc; **ec**, The transparent ectosarc; **a**, A cell of an Alga taken in as food (other cells of the same Alga are obliquely shaded). **B. Amoeba radiosa**, enlarged. The body shows two large vacuoles, but no nucleus or contractile vesicle. The long and delicate pseudopodia are protruded.

these moves about or grasps particles of food. There is no mouth and food is engulfed within any portion of the soft sarcoid body. Reproduction takes place by fission, or by a single pseudopodium detaching itself from the parent body and developing into a separate amœba.

Amol (ä-mol'), a town of northern Persia, 76 miles N.E. of Teheran. Extensive ruins tell of former greatness, the most prominent being the mausoleum of Seyed Quam-u-deen, who died in 1378. Pop. estimated at about 10,000.

Amomum (a-mô'mum), a genus of plants of the natural order Zingiberaceæ (ginger, etc.), natives of warm climates, and remarkable for the

pungency and aromatic properties of their seeds. Some of the species yield cardamoms, others grains of paradise.

Amontillado (a-mon-til-a'dô), a dry kind of sherry wine of a light color, highly esteemed.

Amoo, or AM'OO-DARIA, a river of Central Asia. See *Orus*.

Amoor, or AMUR (ä-moor'), one of the largest rivers of Eastern Asia, formed by the junction of the rivers Shilka and Argun; flows first in a southeastern and then in a northeastern direction till it falls into an arm of the Sea of Okhotsk, opposite the island of Saghalien, after a course of 2760 miles. Its principal tributaries are the Sungari, Usuri, Oldoi, Zeya, Kur, and Gorin. It forms, for a large portion of its course, part of the boundary-line between the Russian and the Chinese dominions, and is navigable throughout for four months in the year.—**AMoor TERRITORY**. In 1858 Russia acquired from China the territory on the left bank of the Upper and Middle Amoor, together with that on both banks of the Lower Amoor. The western portion of the territory was organized as a separate province, with the name of the Amoor (area, 173,000 square miles; population 20,000). The eastern portion was joined to the Maritime Province of Eastern Siberia.

A'mor, the god of love among the Romans, equivalent to the Greek *Erôs*.

Amorgo (ä-mor'gô; ancient *Amorgos*), an island in the Grecian Archipelago, one of the Eastern Cyclades, 22 miles long, 5 miles broad; area, 103 square miles; has a town of the same name, with a castle, and a large harbor. Pop. about 3,500.

Amorites (am'or-its), a powerful Canaanitish tribe at the time of the occupation of the country by the Israelites; occupied the whole of Gilead and Bashan, and formed two powerful kingdoms—a northern, under Og, who is called King of Bashan; and a southern, under Sihon, called King of the Amorites; first attacked and overthrown by Moses; subsequently subdued, and made tributary or driven to mingle with the Philistines and other remnants of the Canaanitish nations.

Amorphous (a-mor'fus) **ROCKS** or **MINERALS**, those having no regular structure, or without crystallization, even in the minutest particles.

Amorphozoa (a-mor-fô-zô'a), a term applied to some of the lower groups of animals, as the sponges and their allies, which have no regular symmetrical structure.

Amortization (a-mor-ti-sā'shun), in law, the alienation of real property to corporations (that is, in *mortmain*), prohibited by several English statutes.

Amos (a'mos), one of the minor prophets; flourished under the kings Uzziah and Jeroboam II of Israel (B.C. 810 to 784 by the common chronology). Though engaged in the occupations of a peasant, he must have had a considerable amount of culture, and his book of prophecies has high literary merits. It contains denunciations of Israel and the surrounding nations, with promises of the Messiah.

Amoy (ā-moi'), an important Chinese trading port, on a small island off the southeast coast opposite Formosa; has a safe and commodious harbor, and its merchants are among the wealthiest and most enterprising in China; one of the five ports opened to British commerce in 1842, now open to all countries. Pop. 114,000.

Ampelidæ (am-pel'i-dē). See *Chat-terera*.

Ampère (ā-pār), **ANDRÉ MARIE**, a French mathematician and founder of the science of electrodynamics, born 1775; died 1836; professor of mathematics at the Polytechnic School and of physics at the College of France. What is known as *Ampère's Theory* is that magnetism consists in the existence of electric currents circulating round the particles of magnetic bodies, being in different directions round different particles when the bodies are unmagnetized, but all in the same direction when they are magnetized. His name has been given to the unit used in measuring the electric current.

Ampère, JEAN JACQUES ANTOINE, an eminent historian and professor of French literature in the College of France; the only son of André-Marie Ampère; born at Lyons 1800, died 1864; chief works *Histoire Littéraire de la France avant la 12^e siècle* (1839); *Introduction à l'Histoire de la Littérature française au moyen-âge* (1841); *Littérature, Voyages et Poésies* (1833); *La Grèce, Rome et Dante, Etudes Littéraires d'après Nature*; *l'Histoire romaine à Rome*, four vols. 8vo (1856-64).

Amphibia (am-fib'i-a), a class of vertebrate animals, which in their early life breathe by gills or branchiæ, and afterwards partly or entirely by lungs. The Frog, breathing in its tadpole state by gills and afterwards throwing off these organs and breathing entirely by lungs in its adult state, is an example of the latter phase of amphibian

existence. The Proteus of the underground caves of Central Europe exemplifies forms in which the gills of early life are retained throughout life, and in



Tailed Amphibians. a, *Siren lacertina*; b, *Amphiuma*, showing the four minute limbs; c, *Menobranchius maculatus*. (After Mivart.)

which lungs are developed in addition to the gills. A second character of this group consists in the presence of two occipital 'condyles,' or processes by means of which the skull articulates with the spine or vertebral column; reptiles possessing one condyle only. The class is divided into four orders: the Ophiomorpha (or serpentiform), represented by the Blindworms, in which limbs are wanting and the body is snake-like; the Urodela or 'Tailed' Amphibians, including the Newts, Proteus, Siren, etc.; the Anoura, or Tailless Amphibia, represented by the Frogs and Toads; and the Labyrinthodontia, which includes the extinct forms known as Labyrinthodons. See *Batrachia*.

Amphictyonic (a-m-fik-ti-o-n'ik) **LEAGUE** (or **COUNCIL**), in ancient Greece, a confederation of tribes for the protections of religious worship, but which also discussed questions of international law and matters affecting their political union. The most important was that of the twelve northern tribes which met alternately at Delphi and Thermopylæ. The tribes sent two deputies each, who assembled with great solemnity; composed the public discussions, and the quarrels of individual cities, by force or persuasion; punished civil and criminal offenses, and particularly transgressions of the law of nations, and violations of the temple of Delphi. Its calling on the States to punish the Phocians for plundering Delphi caused the Sacred wars, 595-586, 448-447, 357-346 B. C.

Amphion (am-f'ion), in Greek mythology, son of Zeus and

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Amphioxus

Antiope, and husband of Niobe; had miraculous skill in music, being taught by Mercury, or, according to others, by Apollo. In poetic legend he is said to have availed himself of his skill when building the walls of Thebes—the stones moving and arranging themselves in proper position at the sound of his lyre.

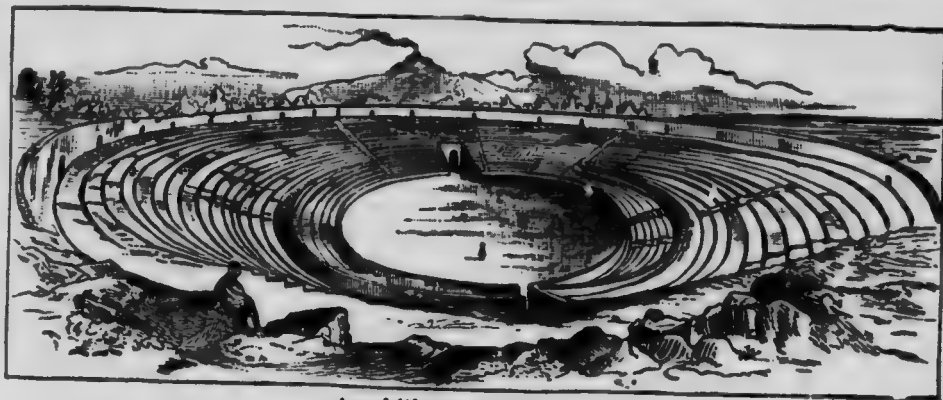
Amphioxus (am-fi-ok'sus). See *Lancelet*.

Amphipoda (am-fip'o-da), an order of sessile-eyed malacostracan crustaceans, with feet directed partly



Amphipoda.—1, Shore-jumper (*Orchestia littoralis*). 2, Portion showing the respiratory organs a a a.

forwards and partly backwards. Many species are found in springs and rivulets; others in salt water. The sand-hopper and shore-jumper are examples.



Amphitheater at Pompeii.

Amphiprostyle (am-fip'ro-stil), in architecture, said of a structure having the form of an ancient Greek or Roman oblong rectangular temple, with a prostyle or portico on each of its ends or fronts, but with no columns on its sides or flanks.

Amphisbæna (am-fis-bæ'na; Gr. from *amphis*, both ways, and *bainō*, to go), a genus of serpentiform, limbless, lacertilian reptiles; body cylindrical, destitute of scales, and divided into numerous annular segments; the tail obtuse, and scarcely to be distinguished from the head, whence the belief that it moved equally well with either end foremost. There are several species, found in tropical America. They feed on

ants and earthworms, and were formerly but erroneously deemed poisonous.

Amphisoi (am-fis'i-i; Gr. *amphi*, on both sides, and *skia*, shadow), a term sometimes applied to the inhabitants of the intertropical regions, whose shadows at noon in one part of the year are cast to the north and in the other to the south, according as the sun is in the southern or northern signs.

Amphitheater (am-fi-the'a-ter), an ancient Roman edifice of an oval form without a roof, having a central area (the *arena*) encompassed with rows of seats, rising higher as they receded from the center, on which people used to sit to view the combats of gladiators and of wild beasts, and other sports. The Colosseum at Rome was the largest of all the ancient amphitheaters, being capable of containing from 50,000 to 80,000 persons. That at Verona is one of the best examples remaining. Its dimensions are 502 feet by 401, and 98 feet high. The name means 'both-ways theater,' or 'theater all round,' the theater forming only a semicircular edifice.

Amphitrite (am-fi-tri'tē), in Greek mythology, daughter of Oceanus and Tethys, or of Nereus and Doris, and wife of Poseidon (or Neptune), represented as drawn in a chariot of shells by Tritons, with a trident in her hand.

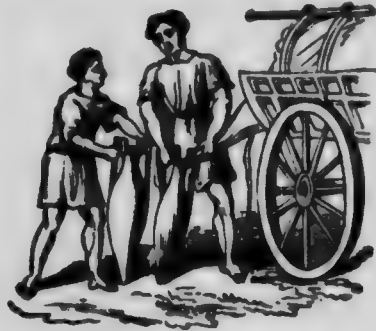
Amphitryon (am-fit'ri-un), in Greek legend, King of Tiryns, son of Alcæus, and husband of Alcmena. Plautus, and after him Molière, have made an amour of Zeus with Alcmena the subject of amusing comedies.

Amphiuma (am-fi-ū'ma), a genus of amphibians which frequent the lakes and stagnant waters of North America. The adults retain the

Amsterdam

clefts at which the gills of the tadpole projected.

Amphora (am'fō-ra), a vessel used by the Greeks and Romans for holding liquids; commonly tall and narrow, with two handles and a pointed end



Filling an Amphora.

which fitted into a stand or was stuck in the ground to enable them to stand upright; also as a cinerary urn, and as a liquid measure,—Gr.=9 gallons; Rom.=6 gallons.

Amplexicaul (am-plek'si-kal), in bot-
any, said of a leaf that
embraces and nearly surrounds the stem

Amplitude (am'pli-tūd), in astronomy, the distance of any celestial body (when referred by a secondary circle to the horizon) from the east or west points.

Ampulla (am-pul'a), in antiquity, a vessel bellying out like a jug, that contained unguents for the bath; also a vessel for drinking at table. The ampulla has also been employed for ceremonial purposes, such as holding the oil or chrism used in various church rites and for anointing monarchs at their coronation. The ampulla of the English sovereigns now in use is in the shape of an eagle. The most celebrated ampulla was that of St. Remy, from which the French kings were anointed.

Amputation (am-pu-tā'shun), in surgery, that operation by which a member is separated from the body according to the rules of the science.

Amraoti (ām-ra-ō'tē), a town of British India in Berār; it is celebrated for its cotton, and is a place of good trade. Pop. about 38,000. Also a district of the same name.

Amritsar, or **AMRITSAR** (um'rit-sar; 'the pool of immortality'), a flourishing commercial town of Hindustan, capital of a district of the same name, in the Punjab, the principal place of the religious worship of the Sikhs. It

has considerable manufactures of shawls and silks; and receives its name from the sacred pond constructed by Ram Das, the apostle of the Sikhs, in which the Sikhs and other Hindus immerse themselves that they may be purified from all sin. Pop. 152,750.

Amru (am'rū), originally an opponent and subsequently a zealous supporter of Mohammed and one of the ablest of the Mohammedan warriors. He brought Egypt under the power of the Caliph Omar in 638, and governed it wisely till his death in 643. The burning of the famous Alexandrian Library has been generally attributed to him, though only on the authority of a writer who lived six centuries later.

Amsterdam (am'ster-dam; that is, the dam of the Amstel'), one of the chief commercial cities of Europe, capital of Holland, situated at the confluence of the Amstel with the Y or IJ (pronounced as *eye*), an arm of the Zuider Zee. On account of the lowness of the site of the city, the greater part of it is built on piles. It is laid out in the form of a crescent and divided by numerous canals into about 100 islands, connected by over 300 bridges. Many of the streets have a canal in the middle with broad brick-paved quays on either side, planted with rows of trees; the houses are generally of brick, many of them six or seven stories



high, with pointed gables turned to the streets. Among the public buildings are the old stadhous, now a royal palace, the interior of which is decorated by the Dutch painters and sculptors of the seventeenth century with their master

Amsterdam

Amygdaloid

pieces; the Nieuwe Kerk (1406), where the sovereigns of Holland are crowned; the Oude Kerk (1300); the Ryks Museum; the exchange; and the Palace of National Industry. Among its numerous industries may be mentioned as a specialty the cutting and polishing of diamonds. The harbor, formed by the Y, lies along the whole of the north side of the city, and is surrounded by various docks and basins. The trade is very great, being much facilitated by the great ship-canal (15 m. long), connecting the Y directly with the North Sea. Population 587,872.

Amsterdam, a city of Montgomery county, New York, on the Mohawk River, 33 miles N. W. of Albany. It has extensive carpet and rug

Amulet (am'n-let), a piece of stone, metal, etc., marked with certain figures or characters, which people in some countries wear as a protection against diseases and enchantments.

Amundsen (a'mund-sen), ROALD, Arctic explorer, born Borje, Norway, in 1872; became a tenant in the navy. He joined the *Belgica* expedition to the Antarctic seas, 1897-99, and left Christiania in 1903 for the Arctic seas. After two years' search he succeeded in locating the north magnetic pole, in King William's land. He then carried his little vessel, the *Gjoa*, to Bering Strait, reaching there in 1906, and being thus the first to navigate the north-west passage from the Atlantic to the



Amsterdam—Scene on the Amstel

factories, large broom, linseed oil, knit goods, and other factories. Pop. 31,267.

Amsterdam, New, a town in British Guiana. See *Berbice*.

Amsterdam Island, a small and almost inaccessible island in the Indian Ocean, about half-way in a direct line between the Cape of Good Hope and Tasmania.

Amu. See *Amoo*, *Oxus*.

Amuck. AMUK. to RUN, a phrase applied to natives of the Eastern Archipelago who are occasionally seen to rush out in a frantic state, making indiscriminate and murderous assaults on all that come in their way.

Pacific. It had been traversed by Robert McClure in 1851, but only partly by ship. In 1910 he projected a voyage to the Arctic Sea, but changed his plan and sailed to the Antarctic, where, on December 14, 1911, he succeeded in reaching the South Pole.

Amur. See *Amoor*.

Amurath (ä-mū-rät') or MURAD, the name of several Ottoman sultans. See *Ottoman Empire*.

Amygdaloid (a-mig'd. loid; Gr. *amygdalē*, an almond), a term applied to an igneous rock, especially trap, containing round or al-

mond-shaped vesicles or cavities partly or wholly filled with crystalline nodules of various minerals, particularly calcareous spar, quartz, agate, zeolite, chlorite, etc.

Amyl (am'il), in chemistry, a hydrocarbon radical believed to exist in many compounds, especially the fusel-oil series, and having the formula C_5H_{11} —*Amyl Nitrite*, or *Nitrite of Amyl*, an amber-colored fluid, smelling and tasting like essence of pears, which has been employed as an anæsthetic and also in relieving cardiac distress, as in angina pectoris. It is also used in epilepsy, asthma, tetanus, etc., and is usually inhaled, causing severe but temporary distress.

Amylene (am'i-lên), an ethereal liquid with an aromatic odor, prepared from fusel-oil (C_5H_{10}). It possesses anæsthetic properties, and has been tried as a substitute for chloroform, but is very dangerous.

Amylic (a-mil'ik) ALCOHOL, one of the products of the fermentation of grain, etc., commonly known by the name of fusel-oil (which see).

Amyloid (am'i-loid), is a term equivalent to 'starchy.' Amyloids are substances like starch, sugar, gum, etc., composed of carbon, hydrogen, and oxygen, the latter two in the proportions found in water. They occur largely in plants, and the animal body is a mixture of proteids, fats, and amyloids, or carbohydrates.

Amyridaceæ (a-mir-i-dā'ce-æ), a natural order of plants, consisting of tropical trees or shrubs, the leaves, bark, and fruit of which abound in fragrant resinous and balsamic juices. Myrrh, frankincense, and the gum-elemi of commerce are among their products. Among the chief genera of the order are *Amyris*, *Balsamodendron*, *Boswellia*, and *Oanarium*.

Ana (a'na, ā'na), the neuter plural termination of Latin adjectives in *anus*, often forming an affix with the names of eminent men to denote a collection of their memorable sayings—thus *Scaligeriana*, *Johnsoniana*, the sayings of Scaliger, of Johnson; or to denote a collection of anecdotes, or gossip matter, as in *bosiana*. Hence, as an independent noun, books recording such sayings; the sayings themselves.

Anabaptists (an-a-bap'tists; from the Greek *anabaptizein*, to rebaptize), a name given to a Christian sect by their adversaries, because, as they objected to infant baptism, they rebaptized those who joined their body. The founder of the sect appears to have been Nicolas Storch, a disciple of

Luther, who seems to have aimed also at the reorganization of society based on civil and political equality. Gathering round him a number of fiery spirits, among whom was Thomas Münzer, he incited the peasantry of Suabia and Franconia to insurrection—the doctrine of a community of goods being now added to their creed. This insurrection was quelled in 1525, when Münzer was put to the torture and beheaded. After the death of Münzer the sectaries dispersed in all directions, spreading their doctrines wherever they went. In 1534 the town of Münster in Westphalia became their center of action. Under the leadership of Bockhold and Matthias their numbers increased daily, and being joined by the restless spirits of the adjoining towns they soon made themselves masters of the town and expelled their adversaries. Matthias became their prophet, but he fell in a sally against the Bishop of Münster, Count Waldeck, who had laid siege to the city. Bockhold then became leader, assuming the name of John of Leyden, King of the New Jerusalem, and Münster became a theater of all the excesses of fanaticism, lust, and cruelty. The town was eventually taken (June, 1535), and Bockhold and a great many of his partisans suffered death. This was the last time that the movement assumed anything like political importance. In the meantime some of the apostles, who were sent out by Bockhold to extend the limits of his kingdom, had been successful in various places, and many independent teachers, who preached the same doctrines, continued active in the work of founding a new empire of pure Christians. They rejected the practice of polygamy, community of goods, and intolerance towards those of different opinions which had prevailed in Münster; but they enjoined upon their adherents the other doctrines of the early Anabaptists, and certain heretical opinions in regard to the humanity of Christ, occasioned by the controversies of that day about the sacrament. The application of the term Anabaptist to the general body of Baptists throughout the world is unwarranted, the Baptists repudiating the name, as they claim to baptize according to the original institution of the rite, and never repeat baptism in the case of those who in their opinion have been so baptized.

Anabas (an'a-bas). See *Olimbing-Perck*.

Anabasis (n-nab'a-sis, 'a going up'), the Greek title of Xenophon's celebrated account of the expedition of Cyrus the Younger against his brother Artaxerxes, King of Persia. The title is

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Anableps

also given to Arrian's work which records the campaigns of Alexander the Great.

Anableps (an'a-bleps), a genus of fishes of the perch family, found in the rivers of Guiana, consisting of but one species, remarkable for a peculiar structure of the eyes, in which there is a division of the iris and cornea, by transverse ligaments forming two pupils, and making the whole eye appear double. This genus belongs to the ovoviparous fishes.

Anabolism (an-ab'ô-lizm), a term indicating the constructive processes which go on within the protoplasm of animal bodies, by which the food materials, beginning at a low level in organic chemistry, pass through an ascending series of growing complexity until fully converted into living matter.

Anacanthini (an-a-kan-thi'ni; Gr. neg. prefix *an*, and *akantha*, a spine), an order of osseous fishes, including the cod, plaice, whiting and other edible species, with spineless fins, the ventral fins absent or below the pectorals, and ductless swim-bladder.

Anacardiaceæ (an-a-kar-di-â'se-ê), a natural order plants, consisting of tropical trees and shrubs which secrete an acrid resinous juice, which is often used as a varnish. Mastic, Japan lacquer, and Martaban varnish are some of their products. The cashew or cashew (genus *Anacardium*), the pistacia, sumach, mango, etc., are members of the order.

Anacharis (a-nak'a-ris), a genus of plants, nat. order Hydrocharidaceæ, the species of which grow in ponds and streams of fresh water; water-thyme or water-weed. *A. Alismastrum* has been introduced from North America into European (including British) rivers, canals, and ponds, and by its rapid growth in dense tangled masses tends to choke them so as materially to impede navigation.

Anachronism (an-ak'ron-izm), an error of chronology by which things are represented as coexisting which did not coexist; applied also to anything foreign to or out of keeping with a specified time. Thus it is an anachronism when Shakespeare, in *Troilus and Cressida*, makes Hector quote Aristotle.

Anaconda (an-a-kon'da), the popular name of two of the largest species of the serpent tribe, viz. a Ceylonese species of the genus *Python* (*P. tigris*), said to have been met with 33 feet long; and *Eunectes murinus*, a native of tropical America, allied to the boa-constrictor, and the largest of the

serpent tribe, attaining the length of 40 feet.

Anaconda, a city, capital of Deer Lodge county, Montana, the center of an active copper and silver mining district. It has the largest copper smelting and refining plant in the world. Pop. 13,253.

Anacreon (a-nak're-on), an amatory lyric Greek poet of the sixth century B.C., native of Teos, in Ionia. Only a few fragments of his works have come down to us; the collection of odes that usually passes under the name of Anacreon is mainly the production of a later time.

Anadyomene (an-a-di-om'e-nê; Greek, rising, especially, 'out of the sea'), a name given to Aphrodite (Venus) when she was represented as rising from the sea, as in the celebrated painting by Apelles, painted for the temple of Æsculapius at Cos, and afterwards in the temple of Julius Cæsar at Rome.

Anadyr (â-nâ'dêr), the most easterly of the larger rivers of Siberia and of all Asia; rises in the Stanovoi Mountains, and falls into the Gulf of Anadyr; length, 460 miles.

Anæmia (a-nê'mi-a; Greek, 'want of blood'), a medical term applied to an unhealthy condition of the body, in which there is a diminution of the red corpuscles which the blood should contain. The principal symptoms are paleness and general want of color in the skin, languor, emaciation, want of appetite, fainting, etc. See *Leukemia*.

Anæsthesia (an-es-thê-si-a), **ANÆSTHESIS**, a state of insensibility to pain, produced by inhaling chloroform, ether, etc., or by the hypodermic injection of other anæsthetic agents. Stovaine and cocaine have been injected into the spinal column for anæsthesia, causing loss of sensation below the injecting point. Cocaine is valuable for local anæsthesia.

Anæsthetics (an-es-thet'iks), medicinal agents employed for the production of insensibility, especially during surgical operations. Various agents have been employed for this purpose from the earliest times, but the scientific use of anæsthetics may be said to date from 1800, when Sir Humphry Davy made experiments on the anæsthetic properties of nitrous oxide, and recommended its use in surgery. In 1818 Faraday established the anæsthetic properties of sulphuric ether, but this agent made no advance beyond the region of experiment, till 1844, when Dr. Wells, a dentist of Hartford, Connecticut, ap-

plied the inhalation of nitrous oxide in the extraction of teeth, but owing to some misadventure did not persevere with it. He was followed in 1846 by Dr. W. T. G. Morton, a Boston dentist, who first employed ether in dentistry and extended its use to other surgical operations. In 1847 Sir James Simpson made the first application of ether in a case of midwifery. Towards the end of the same year Simpson had his attention called to the anæsthetic efficacy of chloroform, and announced it as a superior agent to ether. This agent has since been the most extensively used anæsthetic, though the use of ether still largely prevails in the United States. In their general effects ether and chloroform are very similar; but the latter tends to enfeeble the action of the heart more readily than the former. For this reason great caution has to be used in administering chloroform where there is weak heart action from disease. Local anæsthesia is produced by isolating the part of the body to be operated upon, and producing insensibility of the nerves in that locality. Dr. Richardson's method is to apply the spray of ether, which, by its rapid evaporation, chills and freezes the tissues and produces complete anæsthesia. In 1912 Dr. J. Willis Hassler, of New York, discovered a new method of surgical operation by the injection of an ether solution into the veins of the patient. See *Hydrocele*. Ethyl chloride is used in the same way. A valuable local anæsthetic now employed is cocaine. See *Coca*.

Anagallis (an-a-gal'is) the Pimpernel genus of plants. See *Pimpernel*.

Anagni (ā-nān'yē), a town of Italy, province of Rome; the seat of a bishopric erected in 487. Pop. 10,059.

Anagram (an'a-gram), the transposition of the letters of a word or words so as to form a new word or phrase, a connection in meaning being frequently preserved; thus, *evil*, *vile*; *Horatio Nelson*, *Honor est a Nilo* (honor is from the Nile).

Anahuac (ā-nā-wāk'; Mexican, 'near the water'), an old Mexican name applied to the plateau of the city of Mexico, from the lakes situated there, generally elevated from 6000 to 9000 feet above the sea.

Anakim (an'a-kim), the posterity of Anak, the son of Arba, noted in sacred history for their fierceness and loftiness of stature. Their stronghold was Kirjath-arba or Hebron.

Analogue (an'a-log), in comparative anatomy an organ in one species or group having the same function

as an organ of different structure in another species or group, as the wing of a bird and that of an insect, both serving for flight. Organs in different animals having a similar anatomical structure, development, and relative position, independent of function or form, such as the arm of a man and the wing of a bird, are termed *homologues*.

Analogy (an-al'ō-jī), is the mode of reasoning from resemblance to resemblance. When we find on attentive examination resemblances in objects apparently diverse, and in which at first no such resemblances were discovered, a presumption arises that other resemblances may be found by further examination in these or other objects likewise apparently diverse. It is on the belief in a unity in nature that all inferences from analogy rest. The general inference from analogy is always perfectly valid. Wherever there is resemblance, similarity or identity of cause somewhere may be justly inferred; but to infer the particular cause without particular proof is always to reason falsely. Analogy is of great use and constant application in science, in philosophy, and in the common business of life.

Analysis (an-al'i-sis), the resolution of an object, whether of the senses or the intellect, into its component elements. In philosophy it is the mode of resolving a compound idea into its simple parts, in order to consider them more distinctly, and arrive at a more precise knowledge of the whole. It is opposed to *synthesis*, by which we combine and class our perceptions, and contrive expressions for our thoughts, so as to represent their several divisions, classes and relations.

Analysis, in mathematics, is, in the widest sense, the expression and development of the functions of quantities by calculation; in a narrower sense the resolving of problems by algebraic equations. The analysis of the ancients was exhibited only in geometry, and made use only of geometrical assistance, whereby it is distinguished from the analysis of the moderns, which extends to all measurable objects, and expresses in equations the mutual dependence of magnitudes. Analysis is divided into lower and higher, the lower comprising, besides arithmetic and algebra, the doctrines of functions, of series, combinations, logarithms, and curves, the higher comprising the differential and integral calculus, and the calculus of variations.

In chemistry, analysis is the process of decomposing a compound substance with a view to determine either (a) what ele-

ments it contains (*qualitative analysis*), or (b) how much of each element is present (*quantitative analysis*). Thus by the first process we learn that water is a compound of hydrogen and oxygen, and by the second that it consists of one part of hydrogen by weight to eight parts of oxygen.

Anam (a-nam'), a country of Asia occupying the E. side of the Southeastern or Indo-Chinese Peninsula, along the China Sea, having a length of about 850 miles, with a breadth varying from over 400 miles in the N. to 100 in the middle. It is composed of three parts: Tonquin in the N.; Cochinchina in the S.; and the territory of the Laos tribes, S. W. of Tonquin (together, area, 170,000 square miles, pop. 15,000,000, 9,000,000 being in Tonquin). The coast is considerably indented, especially at the mouths of the rivers, where it affords many commodious harbors. Tonquin is mountainous on the north, but in the east is nearly level, terminating towards the sea in an alluvial plain yielding good crops of rice, cotton, fruits, ginger, and spices, and a great variety of varnish-trees, palms, etc. The principal river is the Song-ka, which has numerous tributaries, many of them being joined together by canals, both for irrigation and commerce. Tonquin is rich in gold, silver, copper, and iron. Cochinchina, generally speaking, unproductive, but contains many fertile spots, in which grain, leguminous plants, sugar-cane, cinamon, etc., are produced in great abundance. Agriculture is the chief occupation, but many of the inhabitants are engaged in the spinning and weaving of cotton and silk into coarse fabrics, the preparation of varnish, iron-smelting, and the construction of ships or junks. The inhabitants are said to be the ugliest of the Mongoloid races of the peninsula, being under the middle size and less robust than the surrounding peoples. Their language is monosyllabic, and is connected with the Chinese. The religion of the majority is Buddhism, but the educated classes hold the doctrines of Confucius. The principal towns are Hanoi, the capital of Tonquin, and Hué, the capital of Cochinchina and formerly of the whole empire. Anam was conquered by the Chinese in 214 B.C., but in 1428 A.D. it completely won its independence. The French began to interfere actively in its affairs in 1847 on the plea of protecting the native Christians. By the treaties of 1862 and 1867 they obtained the southern and most productive part of Cochinchina, subsequently known as French Cochinchina; and in 1874

they obtained large powers over Tonquin, notwithstanding the protests of the Chinese. Finally, in 1883 Tonquin was ceded to France, and next year Anam was declared a French protectorate. As now constituted, Anam forms the central district of French Indo-China, between Tonquin and Cochinchina. Area 52,110 sq. miles; pop. 5,542,882.

Anamorphosis (an-a-mor'fō-sis), a term denoting a drawing executed in such a manner as to present a distorted image of the object represented, but which, when viewed from a certain point, or reflected by a curved mirror or through a polyhedron, shows the object in its true proportions.

Ananas. See *Pine-apple*.

Anapa (än-ä-pä), an important seaport and fortified town in Russian Circassia, on the Black Sea, a station of the Russian navy. Pop. 6676.

Anapaest (an'a-pest), in prosody, a foot consisting of two short and one long syllable, or two unaccented and one accented syllable.

Anaphylaxis (an-a-fi-lak'sis), the word employed by Charles Richet, Professor of Physiology at the University of Paris, to designate the quality which certain poisons possess of increasing instead of diminishing the sensitiveness of an organism to their action. The Nobel Prize in medicine for 1913 was given to Professor Richet for his discoveries in anaphylaxis.

Anaplasty (an'a-plas-ti), a surgical operation to repair superficial lesions, or solutions of continuity, by the employment of adjacent healthy structure. Artificial noses, etc., are thus made.

Anarajapura (än-ä-rä-jä-pu'ra), or ANURADHAPURA, a ruined city, the ancient capital of Ceylon, built about 540 B.C., and said to have covered an area of 300 square miles, doubtless an exaggeration. There are still several dagobas in tolerable preservation, but the great object of interest, the sacred Bo-tree, which lived over 2000 years, was shattered by a storm in 1887.

Anarchists (an'ar-kists), the name applied to those who advocate a society without government. Harmony in such a society would be obtained by free agreements between various groups for the sake of production, consumption, etc. Man in such a society, it is maintained, would react the full individualization not possible either under the present system of capitalist monopoly or under state socialism. The strongest exponent of anarchism in ancient Greece was Zeno, who opposed the state Utopia of Plato. Rabelais and Fénelon expressed

anarchistic ideas, as did the French Encyclopedists and Revolutionists; but it was William Goodwin who first formulated the political and economic conceptions of anarchism, though he did not use the name anarchism. The term was first applied to the society without government by Proudhon in 1840.

Anarthropoda (an-ar-throp'o-da), one of the two great divisions (the *Arthropoda* being the other) of the *Annulosa*, or ringed animals, in which there are no articulated appendages. It includes the leeches, earthworms, tube-worms, etc.

Anas (a'nas), a widely distributed genus of web-footed birds, containing the true ducks.

Anasarca (an-a-sar'ka). See *Dropsy*.

Anastasius I (an-as-tā'she-us), Emperor of the East, succeeded Zeno, A.D. 491, at the age of sixty. He was a member of the imperial life-guard, and owed his elevation to Ariadne, widow of Zeno, whom he married. He gained the popular favor by a judicious remission of taxation, and displayed great vigor in administering the affairs of the empire. He carried on wars with the Persians and with the supporters of Longinus, the brother of Zeno; strengthened the fortifications of Constantinople, and effected other improvements. Died 518.

Anastatica (an-a-stat'ika), a genus of cruciferous plants, including the Rose of Jericho (*A. hierochuntica*). See *Rose of Jericho*.

Anastatic Printing, a mode of obtaining facsimile impressions of any printed page or engraving by transferring it to a plate of zinc, which, on being subjected to the action of an acid, is etched or eaten away with the exception of the parts covered with the ink, which parts, being thus protected from the action of the acid, are left in relief so that they can readily be printed from.

Anastomosis (an-as-to-mō'sis), in animals and plants, the inoculation of vessels, or the opening of one vessel into another, as an artery into another artery, or a vein into a vein. By means of anastomosis, if the course of a fluid is arrested in one vessel it can proceed along others. It is by anastomosis that circulation is reestablished in amputated limbs, and in those cases of aneurism of various kinds when the vessel is tied.

Anathema (a-nath'e-ma), originally a gift hung up in a temple (Greek *anathēmē*, 'to set up'), and dedicated to some god, a votive offering; but it gradually came to be used for

expulsion, curse. The Roman Catholic Church pronounces the sentence of anathema against heretics, schismatics, and all who wilfully pursue a course of conduct condemned by the church. The subject of the anathema is declared an outcast from the church, all the faithful are forbidden to associate with him, and utter destruction is pronounced against him, both body and soul.

Anatidæ (a-nat'i-dæ), a family of swimming birds, including the ducks, swans, geese, etc.

Anatoliæ (an-a-tō'li-a; from Gr. *anatolē*, the sunrise, the Orient), the modern name of Asia Minor. See *Asia Minor*.

Anatomy (a-nat'o-mi), in the literal sense, means simply a cutting up, but is now generally applied both to the art of dissecting or artificially separating the different parts of an organized body (vegetable or animal) with a view to discover their situation, structure, and economy; and to the science which treats of the internal structure of organized bodies. The branch which treats of the structure of plants is called *vegetable anatomy* or *phytotomy*, and that which treats of the structure of animals *animal anatomy* or *zoöatomy*, a special branch of the latter being *human anatomy* or *anthropotomy*. *Comparative anatomy* is the science which compares the anatomy of different classes or species of animals, as that of man with quadrupeds, or that of quadrupeds with fishes; while *special anatomy* treats of the construction, form, and structure of parts in a single animal. The special anatomy of an animal may be studied from various standpoints; with relation to the succession of forms which it exhibits from its first stage to its adult form (*developmental* or *embryotical anatomy*), with reference to the general properties and structure of the tissues or textures (*general anatomy*, *histology*), with reference to the changes in structure of organs or parts produced by disease and congenital malformations (*morbid* or *pathological anatomy*); with reference to the function, use, or purpose performed by the organs or parts (*teleological* or *physiological anatomy*). According to the parts of the body described, the different divisions of human anatomy receive different names; as, *osteology*, the description of the bones; *myology*, of the muscles; *dermatology*, of the ligaments and sinews; *splanchnology*, of the viscera or internal organs, in which are reckoned the lungs, stomach, and intestines, the liver, spleen, kidneys, bladder, pancreas, etc. *Angiology* describes the vessels through which the

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liquids in the body are conducted, including the blood-vessels, which are divided into arteries and veins, and the lymphatic vessels, some of which absorb matters from the bowels, while others are distributed through the whole body, collecting juices from the tissues and carrying them back into the blood. *Neurology* describes the system of the nerves and of the brain; *dermatology* treats of the skin.—Among anatomical labors are particularly to be mentioned the making and preserving of anatomical preparations. Preparations of this sort can be preserved (1) by drying them and clearing away all muscular adhesions, etc., as is done with skeletons, the bones of which are sometimes washed with acids to give firmness and whiteness; (2) by putting them into liquids as alcohol, spirits of turpentine, etc., as is done with the intestines and other soft parts of the body; (3) by injection, which is used with vessels, the course and distribution of which are to be made sensible and the shape of which is to be retained; (4) by tanning and covering with a suitable varnish, as the muscles.

Among the ancient writers or authorities on human anatomy may be mentioned Hippocrates the younger (460-377 B.C.), Aristotle (384-322 B.C.), Herophilus and Erasistratus of Alexandria (fl. about 300 B.C.), Celsus (53 B.C.-37 A.D.), and Galen of Pergamus (140-200), the most celebrated of all the ancient authorities on the science. From his time till the revival of learning in Europe in the fourteenth century anatomy was checked in its progress. In 1315 Mondino, professor at Bologna, first publicly performed dissection, and published a *System of Anatomy*, which was a text-book in the schools of Italy for about 200 years. In the sixteenth century Fallopio of Padua, Eustachi of Venice, Vesalius of Brussels, Varoli of Bologna, and many others, enriched anatomy with new discoveries. In the seventeenth century Harvey discovered the circulation of the blood, Asellius discovered the manner in which the nutritious part of the food is conveyed into the circulation, while the lymphatic system was detected and described by the Dane T. Bartholin. Among the renowned anatomists of later times we can only mention Malpighi, Boerhaave, William and John Hunter, the younger Meckel, Bichat, Rosenmüller, Quain, Sir A. Cooper, Sir C. Bell, Carus, Joh. Müller, Hæckel, Gegenbaur, Owen, Huxley, Gray and Leidy. For the purpose of aiding anatomical study, a statute was passed in England in 1832 which made provision for the wants of surgeons,

and students, by permitting, under certain regulations, the dissection of the bodies of persons who die friendless in almshouses, hospitals, etc. Similar laws have since been enacted in many of the States of this country. Relatives may effectually object to the anatomical examination of a body, even though the deceased had expressed a desire for it.

Anaxagoras (an-aks-ag'o-ras), an ancient Greek philosopher of the Ionic school, born at Clazomenæ, in Ionia, probably about 500 B.C. When only about twenty years of age he settled at Athens, and soon gained a high reputation, and gathered round him a circle of renowned pupils, including Pericles, Euripides, Socrates, etc. At the age of fifty he was publicly charged with impiety and condemned to death, but the sentence was commuted to perpetual banishment. He thereupon went to Lampsacus, where he died about 428. Anaxagoras belonged to the atomic school of Ionic philosophers. He held that there was an infinite number of different kinds of elementary atoms, and that these, in themselves motionless and originally existing in a state of chaos, were put in motion by an eternal, immaterial, spiritual, elementary being, *Nous* (Intelligence), from which motion the world was produced. The stars were, according to him, of earthy materials; the sun a glowing mass, about as large as the Peloponnesus; the earth was flat; the moon a dark, inhabitable body, receiving its light from the sun; the comets wandering stars.

Anaximander (an-aks-i-man'der), an ancient Greek (Ionic) philosopher, was born at Miletus in 611 B.C., and died 547. The fundamental principle of his philosophy is that the source of all things is an undefined substance infinite in quantity. The firmament is composed of heat and cold, the stars of air and fire. The sun occupies the highest place in the heavens, has a circumference twenty-eight times larger than the earth, and resembles a cylinder, from which streams of fire issue. The moon is likewise a cylinder, nineteen times larger than the earth. The earth has the shape of a cylinder, and is placed in the midst of the universe, where it remains suspended. Anaximander occupied himself a great deal with mathematics and geography. To him is credited the invention of geographical maps and the first application of the *gnomon* or style fixed on a horizontal plane to determine the solstices and equinoxes.

Anaximines (an-aks-im'e-nēs), or MILETUS, an ancient Greek (Ionic) philosopher, according to

whom air was the first principle of all things. Finite things were formed from the infinite air by compression and rarefaction produced by eternally existent motion; and heat and cold resulted from varying degrees of density of the primal element. He flourished about 550 B.C.

Anbury (an'be-ri), called also *Club-root* and *Fingers and Toes*, a disease in turnips, in which knobs or excrescences are formed on the root, which is then useless for feeding purposes. By some authorities it is said that the disease is caused by various species of insects depositing their eggs in the body of the root, while others believe that the insects are attracted by the effluvia of the diseased plant.

Ancachs (an-kách'), a dep. of Peru, between the Andes and the Pacific; area, 16,160 sq. miles; pop. about 500,000.

Ances'tor Worship, this, one of the most ancient of religious systems, continues to be the chief element in the religious ideas of perhaps the larger half of mankind. It extends throughout China, where it is the dominant force of faith; it constitutes the Shintoism of Japan; it exists in Hindustan and in other sections of Asia, and among the native inhabitants of America, Africa and Polynesia. In it the reverence for immediate ancestors leads back through a series of more remote and partly divine ancestors to the earliest ancestor, the creator of man—the Old-old-one, or Akulumkulu, of the Zulus, who conquer in battle with the aid of their ancestral spirits. This system of religion is a subdivision of Animism, the spirits of the dead being assimilated to the spirits supposed to reside in the objects of nature, and tending to replace the latter. Ancestor worship has been the home and hearth religion of many peoples who had a more ornate public worship, such as the ancient Greeks and Romans. The belief in a future life of the spirit assumes the existence of another world and the immortality of mankind, a belief which is lacking in some other forms of worship.

Anchises (an-ki'sez), the father of the Trojan hero Æneas, who carried him off on his shoulders at the burning of Troy and made him the companion of his voyage to Italy. He died during the voyage at Drepanum, in Sicily.

Anchitherium (ang-ki-thé'ri-um), an animal that lived in North America and Europe in the Upper Eocene period. It was an ancestor of the horse, having three toes, instead of

one, as in the horse. It was about the size of a small pony.

Anchor (ang'kér), an implement for holding a ship or other vessel at rest in the water. In ancient times large stones or crooked pieces of wood



Trotman's Anchor.

heavily weighted with metal were used for this purpose. The anchor now used is of iron, formed with a strong shank, at one extremity of which is the crown, from which branch out two arms, terminating in broad palms or flukes, the sharp extremity of which is the peak or bill; at the other end of the shank is the stock (fixed at right angles to the plane of the arms), behind which is the ring, to which a cable can be attached. The principal use of the stock is to cause the arms to fall so as one of the flukes shall enter the ground. The anchors of the largest size carried by men-of-war are the *best* and *small bowers*, the *sheet*, and the *spare*, to which are added the *stream* and the *kedg*, which are used for anchoring in a stream or other sheltered place and for warping the vessel from one place to another. Many improvements and novelties in the shape and construction of anchors have been introduced within recent times. The principal names connected with these alterations are those of Lieut. Rodgers, who introduced the *hollow-shanked anchor* with the view of increasing the strength without adding to the weight; Mr. Porter, who made the arms and flukes movable by pivoting them to the stock instead of fixing them immovably, causing the anchor to take a readier and firmer hold, and avoiding the chance of the cable be-



Martin's Anchor.

coming foul; Mr. Trotman, who has further improved on Porter's invention; and M. Martin, whose anchor is of very peculiar form, and is constructed so as to be self-canting, the arms revolving through an angle of 30° either way, and the sharp

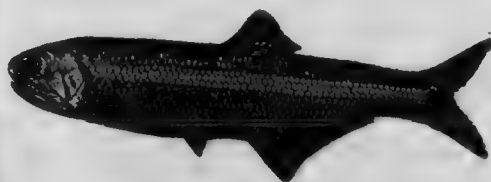
Anchor-ice

points of the flukes being always ready to enter the ground.

Anchor-ice, or ground-ice, a layer of ice which forms on the beds of rivers or shallow brackish seas. It does not form until the temperature is below 10° F. and does not adhere strongly until zero is reached. It does not appear in perfectly still water and is most abundant where the water is most disturbed. When rising it frequently brings up the stones or boulders to which it is attached.

Anchorites (ang'kér-Its), or ANCHORETS (Gr. *anachorētai*, persons who have withdrawn themselves from the world), in the early church a class of religious persons who generally passed their lives in cells, from which they never removed. Their habitations were, in many instances, entirely separated from the abodes of other men, sometimes in the depth of wildernesses in pits or caverns; at other times several of these individuals fixed their habitations in the vicinity of each other, but they always lived personally separate. The continual prevalence of bloody wars, civil commotions, and persecutions at the beginning of the Christian era must have made retirement and religious meditation agreeable to men of quiet and contemplative minds. This spirit, however, as might have been expected, soon led to fanatical excesses; many anchorites went without proper clothing, wore heavy chains, and we find at the close of the fourth century Simeon Stylites passing thirty years on the top of a column without ever descending from it, and finally dying there. In Egypt and Syria, where Christianity became blended with the Grecian philosophy and strongly tinged with the peculiar notions of the East, the anchorites were most numerous; in Europe there were comparatively few, and on the development and establishment of the monastic system they completely disappeared.

Anchovy (an-chō'vi), a small fish of the Herring family, all the species, with exception of the common an-



Anchovy (*Engraulis encrasicolus*).

chovy (*Engraulis encrasicolus*), whose range is restricted to the temperate zone,

inhabitants of the tropical seas of India and America. The common anchovy, so esteemed for its rich and peculiar flavor, is not much larger than the middle finger. It is caught in vast numbers in the Mediterranean, and frequently on the coasts of France, Holland, and the south of England, and pickled for exportation. A favorite sauce is made by pounding the pickled fish in water, simmering for a short time, adding a little cayenne pepper, and straining the whole through a hair-sieve.

Anchovy-pear (*Grias cauliflora*), a tree of the natural order Myrtaceæ, a native of Jamaica, growing to the height of 50 feet, with large leaves and large white flowers, and bearing a fruit somewhat bigger than a hen's egg, which is pickled and eaten like the mango, and strongly resembles it in taste.

Anchusa (an-chū'sa). See *Alkanet*.

Anchylosis (ang-kī-lō'ses). See *Ankylosis*.

Ançillon (an-sē-yōn), JEAN PIERRE FRÉDÉRIC, an author and statesman of French extraction, born at Berlin in 1767 (where his father was pastor of the French reformed church); died there in 1837. He became professor of history in the military academy at Berlin, and in 1806 he was charged with the education of the crown-prince. He successively occupied several important offices of state, being at last appointed minister of foreign affairs. He wrote on philosophy, history, and politics, partly in French, partly in German.

Anckarström. See *Ankarström*.

Ancona (än-kō'nā), a seaport of Italy, capital of the province of the same name, on the Adriatic, 130 miles N. E. of Rome, with harbor works begun by Trajan, who built the ancient mole or quay. A triumphal arch of white marble, erected in honor of Trajan, stands on the mole. The harbor, once the finest on the coast, has been recently improved; Ancona is now a station of the Italian fleet, and the commerce is increasing. The town is indifferently built, but has some remarkable edifices; among others, the cathedral and the Arch of Trajan. There is also a colossal statue of Count Cavour. Ancona is said to have been founded about four centuries B.C., by Syracusean refugees. It fell into the hands of the Romans in the first half of the third century B.C., and became a Roman colony. Pop. 56,835. The province has an area of 740 square miles, and a population of 302,460.

Ancre, *d'*, (*dopkr*), **CONCINO CONCINI**, **MARSHAL AND MARQUIS**, was a native of Florence, and on the marriage of Marie de Médici to Henri IV in 1600 came in her suite to France, where he obtained rapid promotion, more especially after the assassination of the king (1610). He became successively Governor of Normandy, Marshal of France, and last of all, prime-minister. Being thoroughly detested by all classes, at last a conspiracy was formed against him, and he was shot dead on the bridge of the Louvre in 1617.

Ancus Marcius (*ma-r'she-us*), according to the traditional history of Rome, the fourth king of that city, who succeeded Tullus Hostilius, 638, and died 614 B.C. He was the son of Numa's daughter, and sought to imitate his grandfather by reviving the neglected observances of religion. He is said to have built the wooden bridge across the Tiber known as the Sublican, constructed the harbor of Ostia, and built the first Roman prison.

Ancyra. See *Angora*.

Andalusia (*an-da-lu'she-a*; Sp. *Andalucía*), a large and fertile district in the south of Spain, bounded N. by Estramadura and New Castile, E. by Murcia, S. by the Mediterranean Sea, and W. by Portugal and the Atlantic; area, about 33,650 sq. miles, including the modern provinces of Seville, Huelva, Cadiz, Jaen, Cordova, Granada, Almeria, and Malaga. It is traversed throughout its whole extent by ranges of mountains, the loftiest being the Sierra Nevada, many summits of which are covered with perpetual snow (Mulhacen is 11,678 feet). Minerals abound, and several mines have been opened by English companies, especially in the province of Huelva, where the Tharsis and Rio Tinto copper-mines are situated. The principal river is the Guadalquivir. The vine, myrtle, olive, palm, banana, carob, etc., grow abundantly in the valley of the Guadalquivir. Wheat, maize, barley, and many varieties of fruit grow almost spontaneously; besides which, honey, silk, and cochineal form important articles of culture. The horses and mules are the best in the peninsula; the bulls are sought for bull-fighting over all Spain; sheep are reared in vast numbers. Agriculture is in a backward state, and the manufactures are by no means extensive. The Andalusians are descended in part from the Moors, of whom they still preserve decided characteristics. Pop. 3,563,906.

Andaman (*an-da-man'*) **ISLANDS**, a chain of islands on the east side of the Bay of Bengal, the principal being the North, Middle, South, and Little Andamans. Middle Andaman is about 60 miles long, and 15 or 16 miles broad; North and South Andaman are each about 50 miles long. The inhabitants are about 18,000 in number, and mostly in a very savage state, living almost naked in the rudest habitations. They are small (generally much less than 5 feet, resembling the Negritos of the Philippines), well formed, and active, skillful archers and canoeists, and excellent swimmers and divers. These islands have been used since 1858 as a penal settlement by the Indian government, the settlement being at Port Blair, on South Andaman. Here rice, coffee, pineapples, nutmegs, etc., are grown, while the jungle has been cleared off the neighboring hills. The natives in the vicinity of the settlement have become to some extent civilized. The climate is moist, but the settlement is now healthy.

Andante (*an-dan'tä*; It. 'at a walking pace'), in music, denotes a movement somewhat slow, graceful, distinct, and soothing. The word is also applied substantively to that part of a sonata or symphony having a movement of this character.

Andelys, *Les* (*läx änd-läs, on-dlë*), two towns in France called respectively Grand and Petit Andely, distant half a mile from each other, in the department of Eure, on the right bank of the Seine, 19 miles S. E. of Rouen. The town of Grand Andely dates from the 6th century; its church is one of the finest in the department. Petit Andely owes its origin to Richard Cœur de Lion, who, in 1196, built here the Château Gaillard, in its time one of the strongest fortresses in France, but now wholly a ruin. Pop. 4539.

Andenne (*on-den'*), a town of Belgium, province of Namur, on the right bank of the Meuse and 10 miles east of Namur; manufactures delftware, porcelain, tobacco-pipes, paper, etc. Pop. 7111.

Andernach (*än'der-näch*), a town of Rhenish Prussia, on the left bank of the Rhine, 10 miles N. W. of Coblenz, partly surrounded with walls. Pop. 7889.

Andersen (*än'der-sen*). **HANS CHRISTIAN**, a Danish novelist, poet, and writer of fairy tales, was born of poor parents at Odense, 2d April, 1805. He learned to read and write in a charity school, from which he was taken when

Anderson

only nine years old, and was put to work in a manufactory in order that his earnings might assist his widowed mother. In his leisure time he eagerly read national ballads, poetry, and plays, and wrote several tragedies full enough of sound and fury. In 1819 he went to Copenhagen, but failed in getting any of his plays accepted, and in securing an appointment at the theater, having to content himself for some time with unsteady employment as a joiner. His abilities at last brought him under the notice of Councilor Collin, a man of considerable influence, who procured for him free entrance into a government school at Slagelse. From this school he was transferred to the university, and soon became favorably known by his poetic works. Through the influence of Oehlenschläger and others he received a royal grant to enable him to travel, and in 1833 he visited Italy, his impressions of which he published in *The Improvisatore* (1835), a work which rendered him fame European. The scene of his following novel, *O. T.*, was laid in Denmark, and in *Only a Fiddler* he described his own early struggles. In 1835 appeared the first volume of his *Fairy Tales*, of which successive volumes continued to be published year by year at Christmas, and which have been the most popular and widespread of his works. Among his other works are *Picture-books without Pictures*, *A Poet's Bazaar*—the result of a voyage in 1840 to the East—and a number of dramas. In 1845 he received an annuity from the government. He visited England in 1848, and acquired such a command of the language that his next work, *The Two Baronesses*, was written in English. In 1853 he published an autobiography, under the title *My Life's Romance*, an English translation of which, published in 1871, contained additional chapters by the author, bringing the narrative to 1867. Among his later works we may mention, *To Be or Not To Be* (1857); *Tales from Jutland* (1859); *The Ice Maiden* (1863). He died 4th August, 1875, having had the pleasure of seeing many of his works translated into most of the European languages.

Anderson (an'dér-son), JAMES, a Scottish writer on political and rural economy, born in 1739; died in 1808. In 1760 he started the *Bee*, which ran to eighteen vols., and contains many useful papers on agricultural, economical and other topics. Among his other publications, *Recreations in Agriculture*, *Natural History*, etc., contains anticipations of theories

afterwards propounded by Malthus and Ricardo.

Anderson, JOHN, professor of natural philosophy in the University of Glasgow; born 1728, died 1796. By his will he directed that the whole of his effects should be devoted to the establishment of an educational institution in Glasgow, to be denominated *Anderson's University*, for the use of the unacademical classes. According to the design of the founder, there were to be four colleges—for arts, medicine, law, and theology—besides an initiatory school. As the funds, however, were totally inadequate to the plan, it was at first commenced with only a single course of lectures on natural philosophy and chemistry. The institution grew and was later incorporated with other institutions to form the Glasgow and West of Scotland Technical College, the medical school, however, retaining a distinct position.

Anderson, Rasmus Björn, author, born at Albion, Wisconsin, in 1846, of Norwegian parentage, was professor of Scandinavian languages in the University of Wisconsin, 1875-84. Author of *America not Discovered by Columbus*; *Norse Mythology*; *Viking Tales of the North*. U. S. Minister to Denmark (1884-89.)

Anderson, Robert, soldier, born near Louisville, Kentucky, in 1805; graduated at West Point in 1825; was a captain in the Mexican War; major of artillery in 1857; in 1860 took command of the forts in Charleston harbor. He defended Fort Sumter against the Confederate attack, in 1861, the opening event of the civil war, when it became untenable, withdrawing on April 13. He was promoted brigadier-general, but from ill health or other cause took no further part in the war. On April 13, 1865, he raised again over Fort Sumter the flag he had lowered four years before. Died in 1871.

Anderson, county seat of Madison county, Indiana, 35 miles N. E. of Indianapolis. It is a prosperous city with about one hundred manufacturing industries, the principal products of which are files, encaustic tile, wire, wire fence, nails, gas engines, electric motors, buggies, automobiles, tractors, paper boxes, roofing felt, computing scales, pumps and wagons. Pop. 25,000.

Anderson, capital of Anderson Co., South Carolina, 126 miles W. N. W. of Columbia; has cotton and fertilizer industries, oil and yarn mills and a mattress factory. Pop. 9,654.

Andersonville, village in Sumter Co., Ga. Notorious as a military prison during the Civil War. Through overcrowding, lack of food, and general unsanitary conditions 13,000 Federal prisoners died in the enclosure between February, 1864, and April, 1865.

Andes (an'dés), or, as they are called in Spanish South America, **CORDILLERAS** (ridges) **DE LOS ANDES**, or simply **CORDILLERAS**, a range of mountains stretching along the whole of the west coast of South America, from Cape Horn to the Isthmus of Panama and the Caribbean Sea. In absolute length (4500 miles) no single chain of mountains approaches the Andes, and only a certain number of the higher peaks of the Himalayan chain rise higher above the sea level; which peak is the highest of all is not yet settled. Several main sections of this huge chain are distinguishable. The Southern Andes present a lofty main chain, with a minor chain running parallel to it on the east, reaching from Tierra del Fuego and the Straits of Magellan northward to about lat. 28° s., and rising in Aconcagua to a height of 22,860 feet. North of this is the double chain of the Central Andes, inclosing the wide and lofty plateaus of Bolivia and Peru, which lie at an elevation of more than 12,000 feet above the sea. The mountain system is here at its broadest, being about 500 miles across. Here are also several very lofty peaks, as Illampu or Sorata (21,484 feet), Sahama (21,054), Illimani (21,024). Further north the outer and inner ranges draw closer together, and in Ecuador there is but a single system of elevated masses, generally described as forming two parallel chains. In this section are crowded together a number of lofty peaks, most of them volcanoes, either extinct or active. Of the latter class are Pichincha (15,918 feet), with a crater 2500 feet deep; Tunguragua (16,685 feet); Sangay (17,460 feet); and Cotopaxi (19,550 feet). The loftiest summit here appears to be Chimborazo (20,581 feet); others are Antisana (19,260 feet) and Cayambe (19,200 feet). Northward of this section the Andes break into three distinct ranges, the eastmost running northeastward into Venezuela, the westmost running northwestward to the Isthmus of Panama. In the central range is the volcano of Tüllma (18,400 feet). The western slope of the Andes is generally exceedingly steep, the eastern much less so, the mountains sinking gradually to the plains. The whole range gives evidence of volcanic action, but it consists almost entirely of sedimentary rocks. Thus mountains may be

found rising to the height of over 20,000 feet, and fossiliferous to their summits (as Illimani and Sorata or Illampu). There are about thirty volcanoes in a state of activity. These burning mountains are distributed throughout the system, their peaks varying in height from 13,000 to 20,000 feet. All the districts of the Andes system have suffered severely from earthquakes, towns having been either destroyed or greatly injured by these visitations. Peaks crowned with perpetual snow are seen all along the range, and glaciers are also met with, more especially from Aconcagua southwards. The passes are generally at a great height, the most important being from 10,000 to 15,000 feet. Railways have been constructed to cross the chain at a similar elevation. The Andes are extremely rich in the precious metals, gold, silver, copper, platinum, mercury, and tin all being present; lead and iron are also found. The llama and its congeners—the guanaco, vicuña, and alpaca—are characteristic of the Andes. Among birds, the condor is the most remarkable. The vegetation necessarily varies much according to elevation, latitude, rainfall, etc., but generally is rich and varied. Except in the south and north little rain falls on the western side of the range, and in the center there is a considerable desert area. On the east side the rainfall is heavy in the equatorial regions, but in the south is very scanty or altogether deficient. From the Andes rise two of the largest water systems of the world—the Amazon and its affluents, and the La Plata and its affluents. Besides which, in the north, from its slopes flow the Magdalena to the Caribbean Sea, and some tributaries to the Orinoco. The mountain chain pressing so close upon the Pacific Ocean, no streams of importance flow from its western slopes. The most important lake is Titicaca on the Bolivian plateau. In the Andes are towns at a greater elevation than anywhere else in the world, the highest being the silver mining town of Cerro de Pasco (14,270 feet), the next being Potosí. The Transandine Tunnel, on the railway from Valparaiso to Buenos Ayres, was first pierced November 27, 1909, and on April 5, 1910, was formally opened to traffic. Its length is nearly 2 miles, 4538 feet on the Chilean side, 5847 on the Argentine; elevation above sea level is 10,460 feet. It is 18 feet high and 16 feet in width; the railway is narrow gauge and single track. Cost about \$2,500,000.

Andira (an-dí'ra), a genus of leguminous American trees, found mainly in tropical localities.

Andiron (and'í-ern), a horizontal iron bar raised on short legs, with

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Andkhoo

an upright standard at one end, used to support pieces of wood when burning in an open hearth, one andiron being placed on each side of the hearth.

Andkhoo, or **ANDKHOUI** (And-A5', And-A5'1), a town of Afghanistan, about 200 miles s. of Bokhara, on the commercial route to Herat. Pop. estimated at 15,000.

Andocides (an-dos'i-dēs), an Athenian orator, born in 467 B.C., died about 398 B.C. He took an active part in public affairs, and was four times exiled; the first time along with Alcibiades, for profaning the Eleusinian mysteries. Several of his orations are extant.

Andorre, or **ANDORRA** (an-dor', an-dor'ra), a small nominally independent state in the Pyrenees, south of the French department of Ariège, with an area of about 175 square miles. It has been a separate state for six hundred years; is governed by its own civil and criminal codes, and has its own courts of justice, the laws being administered by two judges, one of whom is chosen by France, the other by the Bishop of Urgel, in Spain. The little state pays annually 920 francs (about \$184) to France, and 460 francs to the Bishop of Urgel. The chief industry is the rearing of sheep and cattle. The commerce is largely in importing contraband goods into Spain. The inhabitants, who speak the Catalan dialect of Spanish, are simple in their manners, their wealth consisting mainly of cattle and sheep. The village of Old Andorre is the capital. Pop. about 6,000.

Andover (an-do-ver), a town in England, in Hants, 12 miles N. by W. of Winchester, with a fine church, and a trade in corn, malt, etc. Interesting Roman remains found in the vicinity. Pop. 7596.

An'dover, a town in Massachusetts, 25 miles N. N. W. of Boston, chiefly notable for its literary institutions—Phillip's Academy, founded in 1778; the Andover Theological Seminary, founded in 1807, and a female academy founded in 1829. Pop. 7301.

Andrassy (an-drā'shē), **COUNT JULIUS**, a Hungarian statesman, born in 1823; took part in the revolution of 1848, was condemned to death, but escaped and went into exile; appointed premier when self-government was restored to Hungary in 1867; became imperial minister for foreign affairs in 1871, retiring from public life in 1879. Died in 1890.

Andre' (an'drā), **MAJOR JOHN**, adjutant-general in the British army during the American Revolutionary War. Employed to negotiate the

defection of the American general Arnold, and the delivery of the works at West Point, he was apprehended in disguise, September 23, 1780, within the American lines, declared a spy from the enemy, and hanged Oct. 2, 1780. His remains were brought to England in 1821 and interred in Westminster Abbey, where a monument has been erected to his memory.

Andree (an'dre-ē), **JOHANN VALENTIN**, a German author, born in 1596; died in 1654. He was the author of numerous tracts, several of them of an amusing and satirical character; and was long believed to be the founder of the celebrated Rosicrucian order, an opinion that received a certain support from some of his works.

Andrejef (än-drä'ef), **LEONID**, a Russian author, born in the government of Orel, Russia, in 1871. He has written short stories and plays, of which many have been translated into English, including the plays *Savra* and *The Life of Men*.

An'dree, **SALOMON AUGUST**, Swedish aeronaut, born about 1855. He was examiner-in-chief at the patent office, practiced aeronautics, and in 1893 projected a balloon voyage to the North Pole. He started in 1897, with two companions, from Danes Island, east of Spitzbergen, and was never heard of afterwards.

Andrew (an'drū), **St.**, brother of St. Peter, and the first disciple whom Christ chose. He is said to have preached in Scythia, in Thrace and Asia Minor, and in Achaia (Greece), and according to tradition he was crucified at Patrae, now Patras, in Achaia, on a cross of the form X. Hence such a cross is now known as a St. Andrew's cross. The Russians revere him as the apostle who brought the gospel to them; the Scots, as the patron saint of their country. The day dedicated to him is the 30th of November. The Russian order of St. Andrew, the highest of the empire, was instituted by Peter the Great in 1698. For the Scottish Knights of St. Andrew or the Thistle, see *Thistle*.

An'drews, **ELI SHA BENJAMIN**, educator, born at Hilldale, New Hampshire, in 1844. He served in the Civil war, losing an eye in battle. Graduating at Brown University in 1870 and in theology in 1874, he became professor of history and political economy at Brown in 1882, professor at Cornell in 1888, and president of Brown in 1889. He became superintendent of schools in Chicago in 1898; chancellor of the University of Nebraska, 1900-1908. Among his several works are *History of the Last Quarter Century in the United States*.

Andrews

Andrewes (an'drūs), LANCELOT, an eminent and learned bishop of the English Church; born in London in 1555; died at Winchester 1626; was high in favor both with Queen Elizabeth and James I. In 1605 he became Bishop of Chichester, in 1609 was translated to Ely, and appointed one of the king's privy-councillors; and in 1618 he was translated to Winchester. He was one of those engaged in preparing the authorized version of the Scriptures. He left sermons, lectures, and other writings.

An'drews, Sr., an ancient city and seat of a university in Fifeshire, Scotland, 31 miles N.E. from Edinburgh; was erected into a royal burgh by David I in 1140, and after having been an episcopal, became an archiepiscopal see in 1472, and was for long the ecclesiastical capital of Scotland. The cathedral, now in ruins, was begun about 1160, and took 157 years to finish. The old castle, founded about 1200, and rebuilt in the fourteenth century, is also an almost shapeless ruin. In it James III was born and Cardinal Beaton assassinated, and in front of it George Wishart was burned. There are several other interesting ruins. The trade and manufactures are of no importance, but the town is in favor as a watering-place. Golfing is much played here.—The UNIVERSITY OF ST. ANDREWS, the oldest of the Scotch universities, founded in 1411, consists of three colleges, St. Salvator, St. Leonard's, and St. Mary's. Originally all three had teachers both in arts and theology; but in 1579 the colleges of St. Salvator and St. Leonard were confined to the teaching of arts and medicine, and that of St. Mary to theology. In 1747 the two former colleges were united by act of Parliament. The average number of students is about 200. In connection with the university is a library containing about 100,000 printed volumes and numerous MSS. The university unites with that of Edinburgh in sending a member to Parliament. Madras College or Academy, founded by Dr. Bell, of Madras, the principal secondary school of the place, provides accommodation for upwards of 1,500 scholars. Pop. 7,621.

Andria (an'drā-ā), a town of South Italy, province of Bari, with a fine cathedral, founded in 1046; the church of Sant' Agostino, with a beautiful pointed Gothic portal; a college; manufactures of majolica, and a good trade. Pop. 49,569.

Androecium (an-drē'si-um), in botany, the male system of a flower; the aggregate of the stamens.

Andromache (an-drom'a-kā), in Greek mythology, wife of Hector, one of the most attractive female characters of Homer's *Iliad*. The passage describing her parting with Hector when he was setting out to his last battle is well known and much admired. Euripides and Racine have made her the chief character of tragedies.

Andromeda (an-drom'e-da), in Greek mythology, daughter of the Ethiopian king Cepheus and of Cassiopeia. Cassiopeia having boasted that her daughter surpassed the Nereids, if not Hērā (Juno) herself, in beauty, the offended maidens prevailed on their father, Poseidon (Neptune), to afflict the country with a horrid sea monster, which threatened universal destruction. To appease the offended god, Andromeda was chained to a rock, but was rescued by Perseus; and after death was changed into a constellation.

Andromeda, a genus of plants belonging to the heaths. One species, *A. polifolia*, wild rosemary, a beautiful evergreen shrub, grows by the side of ponds and in swamps in the Northern States.

Andronicus (an-dro-ni'kus), the name of four emperors of Constantinople.—ANDRONICUS I, Comnenus; born 1110; killed by the people for his cruelty in 1185.—ANDRONICUS II, Palæologus, born 1258; died 1332. His reign is celebrated for the invasion of the Turks.—ANDRONICUS III, Palæologus the Younger, born 1296; died 1341.—ANDRONICUS IV, Palæologus, eldest son of John V; dethroned his father in 1377, who recovered his throne with the aid of the Turks. Died 1385.

Androni'cus, of Rhodes, a peripatetic philosopher who lived at Rome in the time of Cicero. He arranged Aristotle's works in much the same form as they retain in present editions.

Androni'cus, LIVIVS, the most ancient of the Latin dramatic poets; flourished about 240 B.C.; by origin a Greek, and long a slave. A few fragments of his works have come down to us.

Androni'cus Cyrrhestes (sir-es-tēz), a Greek architect about 100 B.C., who constructed at Athens the Tower of the Winds, an octagonal building, still standing. On the top was a Triton, which indicated the direction of the wind. Each of the sides had a sort of dial, and the building formerly contained a clepsydra or water-clock.

Andropogon (an-dro-pō'gon), a large genus of grasses, mainly natives of warm countries. *A. sch-*

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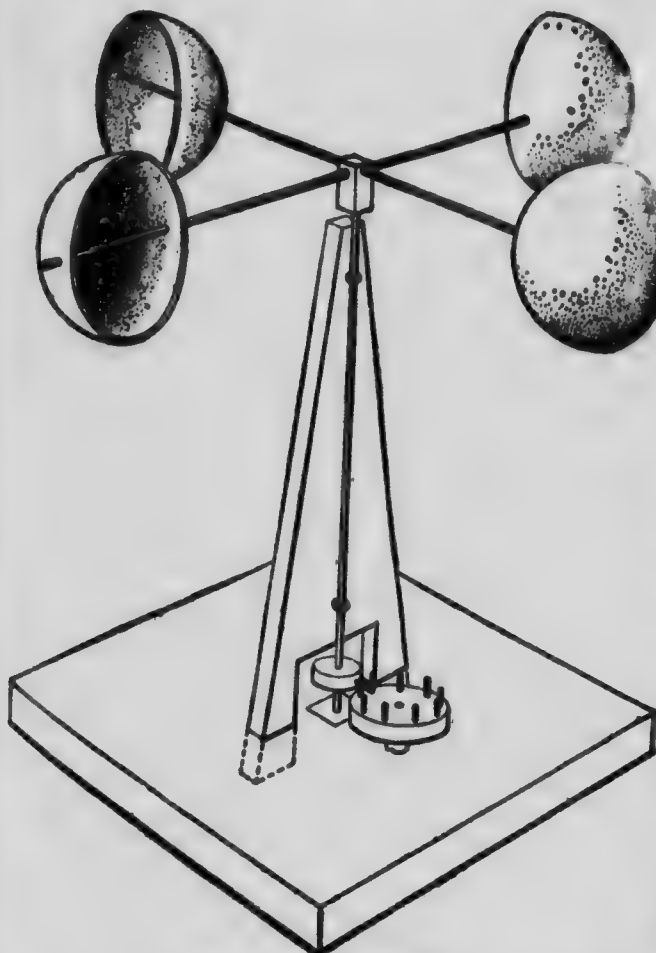
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Andros

Andros is the sweet-scented lemon-grass of conservatories. Others also are fragrant.

Andros (an'dros), Sir EDMUND (1687-1714), an English colonial governor in America, born in London. He was governor of New York 1674-81, and in 1686 became governor of the New England colonies united into one province, the Dominion of New England. In 1688 New York and New Jersey were attached to New England and his rule extended over the territory between the Delaware and the St. Croix. On complaint of the colonists of New England he was sent to England, but was never formally tried. He returned to America and was governor of Virginia 1692-98.



Home-made Anemometer.

Andujar (an-dū-jār'), a town in 1846, and is the kind chiefly used in finding velocities. There are various other forms of instruments, one of which is portable,

Anemometer

quiver, which is here crossed by a fine bridge; manufactures a peculiar kind of porous earthen water bottles and jugs (*alcarrases*). Pop. 16,302.

Anecdote (an'ek-dôt), originally some particular relative to a subject not noticed in previous works on that subject; now any particular or detached incident or fact of an interesting nature; a single passage of private life.

Anegada (an-ā-gā'dā), a British West India island, the most northern of the Virgin group, 10 miles long by 4½ broad; contains numerous salt ponds, from which quantities of salt are obtained.

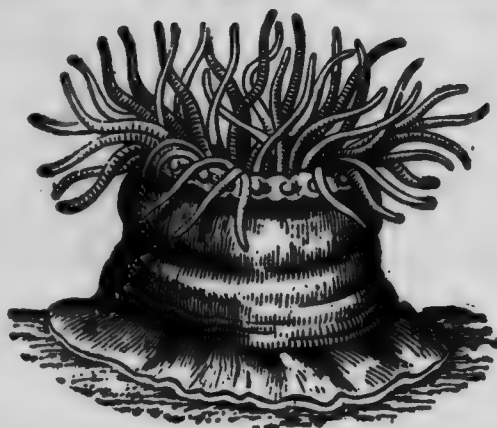
Anelectric, not easily excited.

Anelectrode, a post-pole of a galvanic battery.

Anemometer (an-ē-mō-mē-ter; Gr. *anemos*, wind, *metron*, measure), an instrument for measuring the force and velocity of the wind. This force is usually measured by the pressure of the wind upon a small plate attached to one end of a spiral spring (with its axis horizontal), which yields more or less according to the force of the wind, and transmits its motion to a pencil which leaves a trace upon paper moved by clockwork. For indicating the velocity of the wind, the instrument which has yielded the best results consist of four hemispherical cups attached to the ends of equal horizontal arms, forming a horizontal cross which turns freely about a vertical axis which is strengthened and supported. By means of an endless screw (worm) carried by the axis a train of wheel-work is set in motion; and the indication is given by a hand which moves round a dial; or in some instruments by several hands moving round different dials like those of a gas-meter. This was invented by Robinson in

adaptable to varying conditions of space, and is especially intended for measuring the velocity of currents of air passing through mines, and the ventilating spaces of hospitals and other public buildings. The direction of the wind as indicated by a vane can also be made to leave a continuous record by various contrivances; one of the most common being a pinion carried by the shaft of a vane, and driving rack which carries a pencil.

Anemone (an-em'o-nē; Gr. *anemos*, wind), wind-flower, a genus of plants belonging to the Buttercup family (*Ranunculaceæ*), containing many species. The wood anemone, *A. nemorosa*, is a common and interesting



See Anemone (*Actinia mesembryanthemum*).

little plant, and its white flowers are an ornament of many a woodland scene and mountain pasture in April and May. *A. coronaria* is a hardy plant, with large variegated flowers. *A. hortensis*, star anemone, is one of the finest species.

Anem'one, SEA. See *Sea-anemone*.

Anemophilous (an-e-mof'i-lus), said of flowers that are fertilized by the wind conveying the pollen.

Anemoscope (a-nem'o-skōp), any contrivance indicating the direction of the wind; generally applied to a vane which turns a spindle descending through the roof to a chamber, where, by means of a compass-card and index, the direction of the wind is shown.

Anemosis (a-ne-mō'sis), the condition in timber also known as wind-shaken, indicated internally by a breaking of connection between the annual layers. It occurs in many species of trees and has been ascribed to the effect of violent winds, but is more probably due to frost or lightning.

Aneroid (an'e-roid) Barometer. See *Barometer*.

Anethum (a-nē'thum), a genus of plants; dill.

Aneurin (an'ū-rin), a poet and prince of the Cambrian Britons who flourished about 600 A.D., author of an epic poem, the *Gododin*, relating the defeat of the Britons of Strathclyde by the Saxons at the battle of Cattraeth.

Aneurism, Aneurysm (an'ū-rizm. Gr. *aneurysma*, a widening), the dilatation or expansion of some part of an artery. Aneurisms arise partly from the too violent motion of the blood, and partly from degenerative changes occurring in the coats of the artery, diminishing their elasticity. They are therefore more frequent in the great branches and particularly in the vicinity of the heart, in the arch of the aorta, and in the extremities, where the arteries are exposed to frequent injuries by stretching, violent bodily exertions, thrusts, falls, and contusions. An internal aneurism may burst and cause death.

Angara (āng-gā-rā'), a Siberian river which flows into Lake Baikal at its N. extremity, and leaves it near the S. W. end, latterly joining the Yenisei as the Lower Angara or Upper Tunguska.

Angel (ān'jel; Greek *angelos*, a messenger), one of those spiritual intelligences who are regarded as dwelling in heaven and employed as the ministers or agents of God. To these the name of good angels is sometimes given, to distinguish them from bad angels, who were originally created to occupy the same blissful abode, but lost it by rebellion. Scripture frequently speaks of angels, but with great reserve, Michael and Gabriel alone being mentioned by name in the canonical books, while Raphael is mentioned in the Apocrypha. The angels are represented in Scripture as in the most elevated state of intelligence, purity, and bliss, ever doing the will of God so perfectly that we can seek for nothing higher or better than to aim at being like them. There are indications of a diversity of rank and power among them, and something like angelic orders. They are represented as frequently taking part in communications made from heaven to earth, as directly and actively ministering to the good of believers, and shielding or delivering them from evils incident to their earthly lot. That every person has a good and a bad angel attendant on him was an early belief, and is held to some extent yet. Roman Catholics show a certain veneration of

Angel

honor to angels, and beg their prayers and their kind offices; St. Paul, in Col. ii: 18, forbids the worship of angels.

Angel, a gold coin introduced into England in the reign of Edward IV and coined down to the Commonwealth, so named from having the repre-



Angel of Queen Elizabeth.

sentation of the archangel Michael piercing a dragon upon it. It had different value in different reigns, varying from 6s. 8d. to 10s.

Angel-fish, a fish, *Squatina angelus*, nearly allied to the sharks, very ugly and voracious, preying on other fish. It is from 6 to 8 feet long, and takes its name from its pectoral fins, which are very large, extending horizontally like wings when spread. This fish connects the rays with the sharks, but it differs from both in having its mouth placed at the extremity of the head. It is common on the south coasts of Britain, and is also called *Monk-fish* and *Fiddle-fish*.

Angelica (an-jel'i-ka), a genus of tall umbelliferous plants found in the northern temperate regions and in New Zealand. *A. sylvestris* is the wild angelica of England, and *A. officinalis* is the garden angelica of Europe. The latter is a native of the banks of rivers and wet ditches in the northern parts of Europe, where it is also grown for its strong and agreeable aromatic odor. The garden angelica was at one time much cultivated for the blanched stalks, which were used as celery is now. The tender stalks and midribs of the leaves, candied, are still a well-known article of confectionery. Linnaeus describes the use of the dried root in Lapland as tobacco, and of the stem as a vegetable. *A. atropurpurea* is the great angelica of the United States.—The name has been given to a sweet wine made in California.

Angelico (an-jel'i-kō), FRA, the common appellation of *Fra Giovanni da Fiesole*, one of the most celebrated of the early Italian painters. Born 1387, he entered the Dominican order in 1407, and was employed in painting the monastery of S. Marco in Florence, and S. Domenico in Fiesole, with a

series of frescoes. These pictures gained him so much celebrity that Nicholas V invited him to Rome, to ornament his private chapel in the Vatican, and offered him the archbishopric of Florence, which was declined. He died at Rome 1455. His works were considered unrivaled in finish and in sweetness and harmony of color, and were made the models for religious painters of his own and succeeding generations. His easel pictures are not rare in European galleries.

Angell (an'jel), JAMES BURRILL, scholar and diplomat, born at Scituate, Rhode Island, in 1829; graduated at Brown University in 1849, and was professor of modern languages there, 1853-60. Edited the *Providence Journal*, 1860-66, was president of the University of Vermont 1866-71, and afterwards president of the University of Michigan. In 1880-81 he was Minister to China, and to Turkey 1897-98. Died April 11, 1916.

Angeln (an'eln), a district in Schleswig of about 300 sq. m., bounded N. by the Bay of Flensburg, S. by the Schlei, E. by the Baltic, the only continental territory which has retained the name of the Angles.

Angelo (an'je-lō), MICHAEL. See *Buonarrotti*.

Angelus (an'je-lus), in the Roman Catholic Church a short form of prayer in honor of the incarnation, consisting mainly of versicles and responses, the angelic salutation three times repeated, and a collect, so named from the word with which it commences, 'Angelus Domini' (Angel of the Lord). Hence, also, the bell tolled in the morning, at noon, and in the evening to indicate the time when the angelus is to be recited.

Angermann (ong'er-man), a Swedish river which falls into the Gulf of Bothnia after a course of 200 miles, and is noted for its fine scenery.

Angermünde (ang'er-mūn-de), a town in Prussia, on Lake Münde, 42 miles northeast of Berlin. Pop. 7,406.

Angers (an-zhā), a town and river-port of France, capital of the department of Maine-et-Loire, and formerly of the province of Anjou, on the banks of the Maine, 5½ miles from the Loire, 150 miles S.W. of Paris. Has an old castle, once a place of great strength, now used as a prison, barrack, and powder-magazine; a fine cathedral of the twelfth and thirteenth centuries, with very fine old painted windows, and the remains of a hospital founded by Henry II of England in 1155; manufactures sail-cloth, hosiery, leather and

chemicals. In the neighborhood are immense slate-quarries. Pop. 73,585.

Angevins (an'je-vins), natives of Anjou, often applied to the race of English sovereigns called Plantagenets (which see). Anjou became connected with England by the marriage of Matilda, daughter of Henry I, with Geoffrey V, Count of Anjou. The Angevin kings of England were Henry II, Richard I, John, Henry III, Edward I, Edward II, Edward III, and Richard II.

Angilbert (ang'gil-bert), St., the most celebrated poet of his age, secretary and friend of Charlemagne, whose daughter, Bertha, he married. In the latter part of his life he retired to a monastery, of which he became abbot. Was the author of some extant Latin poems. Died 814.

Angina Pectoris (an-jl'na pek'to-ris), or **HEART-SPASM**, a disease characterized by an extremely acute constriction, felt generally in the lower part of the sternum, and extending along the whole side of the chest and into the corresponding arm, a sense of suffocation, faintness, and apprehension of approaching death: seldom experienced by any but those with organic heart disease. The disease rarely occurs before middle age and is more frequent in men than in women. Those liable to attack must lead a quiet, temperate life, avoiding all scenes which would unduly rouse their emotions. The first attack is occasionally fatal, but usually death occurs as the result of repeated seizures. The paroxysm may be relieved by opiates, or the inhalation, under due precaution, of anæsthetic vapors.

Angiosperm (an'ji-s-spér-m), a term for any plant which has its seeds enclosed in a seed-vessel. Exogens are divided into those whose seeds are enclosed in a seed-vessel and those with seeds produced and ripened without the production of a seed-vessel. The former are *angiosperms*, and constitute the principal part of the species; the latter are *gymnosperms*, and chiefly consist of the Coniferae and Cycadaceae.

Angle (ang'gl), the point where two lines meet, or the meeting of two lines in a point. A *plane rectilinear angle* is formed by two straight lines which meet one another, but are not in the same straight line; it may be considered the degree of opening or divergence of the two straight lines which thus meet one another. A *right angle* is an angle formed by a straight line falling on another perpendicularly, or an angle which is measured by an arc of 90 de-

grees. When a straight line, as *A B* (fig. 1), standing on another straight line *C D*, makes the two angles *A B C* and *A B D* equal to one another, each of these angles



is called a *right angle*. An *acute angle* is that which is less than a right angle, as *E B C*. An *obtuse angle* is that which is greater than a right angle, as *E B D*. Acute and obtuse angles are both called *oblique*, in opposition to right angles. *Exterior or external angles*, the angles of any rectilinear figure without it, made by producing the sides; thus, if the sides *A B*, *B C*, *C A* of the triangle *A B C* (fig. 2) be produced to the points *F D E*, the angles *C B F*, *A C D*, *B A E* are called *exterior or external angles*. A *solid angle* is that which is made by more than two plane angles meeting in one point and not lying in the same plane, as the angle of a cube. A *spherical angle* is an angle on the surface of a sphere, contained between the arcs of two great circles which intersect each other.

Angle-indicator, a sort of up-and-down compass used by aviators. It consists of a circular cup, with degrees marked by lines running around it. The pendulum is an arm mounted on a large ball.

Angler-fish (ang'gler; *Lophius piscatorius*), also from its habits and appearance called *Fishing-frog* and *Sea-devil*, a remarkable fish often found on the British coasts. It is from 2 to 5 feet long; the head is very wide, depressed, with protuberances, and long movable tendrils; the mouth is capacious.

Angles (an'gles) a Low German tribe that in the earliest historical period had its seat in the district about Angeln, in the duchy of Schleswig, and in the fifth century and subsequently crossed over to Britain along with bands of Saxons and Jutes (and probably Frisians also), and colonized a great part of what from this tribe has received the name of England, as well as a portion of the Lowlands of Scotland. The Angles formed the largest body among the Germanic settlers in Britain, and founded the three kingdoms of East Anglia, Mercia, and Northumbria.

Anglesey (ang'gl-se), or **ANGLESEA** ('the Angles' Island'), an island and county of North Wales, in the

Anglesey

Angling

Irish Sea, separated from the mainland by the Menai Strait; 20 miles long and 17 miles broad; area, 176,630 acres. The surface is comparatively flat, the climate is milder than that of the adjoining coast, and the soil fertile and tolerably well cultivated. Anglesey yields a little copper, lead, silver, ocher, etc. The Menai Strait is crossed by a magnificent suspension-bridge, 580 feet between the piers and 100 feet above highwater mark, and also by the great Britannia Tubular Railway Bridge. The chief market-towns are Beaumaris, Holyhead, Llangefni, and Amlwch. Pop. 50,943.

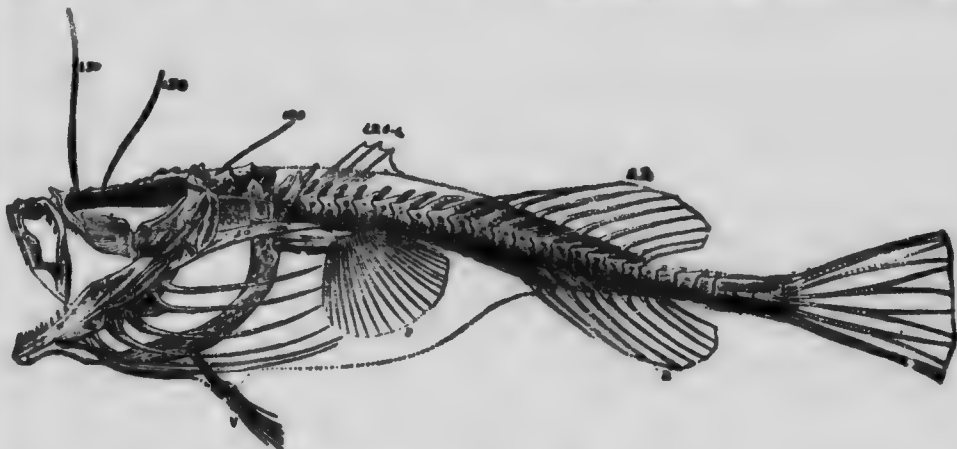
Anglesey, HENRY WILLIAM PAGET, MARQUIS OF. English soldier and statesman, the eldest son of Henry, first Earl of Uxbridge, was born in 1768. Educated at Oxford, he entered the army in 1793, and in 1794 he took

1833. In 1846-52 he was master-general of the ordnance. He died in 1854.

Anglican (ang'gli-kan) CHURCH. See *England—Church*.

Anglican Communion, a term used to denote the various churches throughout the world in communion with the Church of England. As an integral body it is represented by its bishops at the Lambeth Conferences, held from time to time. The Anglican Communion includes the Church of England, the Church of Ireland, the Church in Scotland, the Protestant Episcopal Church of the United States, the Canadian Church, and the Episcopal churches in India and Ceylon, Japan, Australasia, South Africa, etc.

Angling (ang'gling), the art of catching fish with a hook or *angle* (A. Sax. *engel*) baited with worms, small



Skeleton of Angler-fish (*Lophius piscatorius*).

part in the campaign in Flanders under the Duke of York. In 1808 he was sent into Spain with two brigades of cavalry to join Sir John Moore, and in the retreat to Coruña commanded the rear guard. In 1812 he became, by his father's death, Earl of Uxbridge. On Napoleon's escape from Elba he was appointed commander of the British cavalry, and at the battle of Waterloo, by the charge of the heavy brigade overthrew the Imperial Guard. For his services he was created Marquis of Anglesey. In 1828 he became lord-lieutenant of Ireland and made himself extremely popular, but was recalled in consequence of favoring Catholic emancipation. He was again lord-lieutenant in 1830; but lost his popularity by his opposition to O'Connell and his instrumentality in the passing of the Irish Coercion acts; and he quitted office in

fish, flies, etc. We find occasional allusions to this pursuit among the Greek and Latin classical writers; it is mentioned several times in the Old Testament, and it was practised by the ancient Egyptians. The oldest work on the subject in English is the *Treatyse of Fysshinge with an Angle*, printed by Wynkyn de Worde in 1496, along with treatises on hunting and hawking, the whole being ascribed to Dame Juliana Berners or Barnes, prioress of a nunnery near St. Alban. Walton's inimitable discourse on angling was first printed in 1653. The chief appliances required by an angler are a rod, line, hooks, and baits. Rods are made of various materials, and of various sizes. The cane rods are lightest; and where fishing-tackle is sold they most commonly have the preference; but in country places the rod is often of the angler's own man-

ufacture. Rods are commonly made in separate joints so as to be easily taken to pieces and put up again. They are made to taper from the butt end to the top, and are usually possessed of a considerable amount of elasticity. In length they may vary from 10 feet to more than double, with a corresponding difference in strength—a rod for salmon being necessarily much stronger than one suited for ordinary brook trout. The *reel*, an apparatus for winding up the line, is attached to the rod near the lower end, where the hand grasps it while fishing. The best are usually made of brass, are of simple construction, and so made as to wind or unwind freely and rapidly. That part of the line which passes along the rod and is wound on the reel is called the *reel line*, and may vary from 20 to 100 yards in length, according to the requirements of the situation; it is usually made of twisted horse hair and silk, or of oiled silk alone. The casting line, which is attached to this, is made of the same materials, but lighter and finer. To the end of this is tied a piece of fine gut, on which the hook, or hooks, are fixed. The casting or gut lines should decrease in thickness from the reel line to the hooks. The size and kind of hook must of course entirely depend on the kind of fish that are angled for. Floats formed of cork, goose and swan quills, etc., are often used to buoy up the hook so that it may float clear of the bottom. For heavy fish or strong streams a cork float is used; in slow water and for lighter fish quill floats. Baits may consist of a great variety of materials, natural or artificial. The principal natural baits are worms: common garden worms, brandlings, and red worms, maggots, insects, small fish (as minnows), salmon roe, etc. The artificial flies so much used in angling for trout and salmon are composed of hairs, furs, and wools of every variety. Some angling authorities recommend that the artificial flies should be made to resemble as closely as possible the insects on which the fish is wont to feed, but experience has shown that the most capricious and unnatural combination of feather, fur, etc., have been often successful where the most artistic imitations have failed. Artificial minnows, or other small fish, are also used by way of bait, and are so contrived as to spin rapidly when drawn through the water in order to attract the notice of the fish angled for. Angling, especially with the fly, demands a great deal of skill and practice, the throwing of the line properly being the initial difficulty.

Anglo-Saxons

(ang'glo-saks'uns), the name commonly given to the nation or people formed by the amalgamation of the Angles, Saxons, and Jutes, who settled in Britain in the fifth and sixth centuries. The tribes who were thus the ancestors of the bulk of the English-speaking nationalities came from North Germany, where they inhabited the parts about the mouths of the Elbe and Weser, and the first body of them who gained a footing in Britain are said to have landed in 449, and to have been led by Hengist and Horsa. From the preponderance of the Angles the whole country came to be called *Engla-land*, that is, the land of the Angles or English. As an outline of Anglo-Saxon history will be found in the article *England*, we shall here give only some particulars regarding the institutions and customs, language and literature, of the Anglo-Saxons.

The whole Anglo-Saxon community was frequently spoken of as consisting of the *eorls* and the *ceorls*, or the nobles and common freemen. The former were the men of property and position, the latter were the small landholders, handicraftsmen, etc., who generally placed themselves under the protection of some nobleman, who was hence termed their *hloford* or lord. Besides these there was the class of the *serfs* or slaves (*theowas*) who might be either born slaves or freemen who had forfeited their liberty by their crimes, or whom poverty or the fortune of war had brought into this position. They served as agricultural laborers on their masters' estates, and were mere chattels, as absolutely the property of their master as his cattle.

The king (*cuning*, *cyng*) was at the head of the state; he was the highest of the nobles and the chief magistrate. He was not looked upon as ruling by any divine right, but by the will of the people, as represented by the *witan* (wise men) or great council of the nation. The new king was not always the direct and nearest heir of the late king, but one of the royal family whose abilities and character recommended him for the office. He had the right of maintaining a standing army of household troops, the duty of calling together the *witan*, and of laying before them public measures, with certain distinctions of dress, dwelling, etc., all his privileges being possessed and exercised by the advice and consent of the *witena-gemot* or parliament (lit. meeting of the wise). Next in rank and dignity to the king were the *caldormen*, who were the chief *witan* or counselors, and without whose assent laws could not be made, altered, or abrogated. They were

at the head of the administration of justice in the shires, possessing both judicial and executive authority, and had as their officers the *scir-gerefa* or sheriffs. The ealdorman and the king were surrounded by a number of followers called *thegns* or thanes, who were bound by close ties to their superior. The *scir-gerefa* (shire-reeve or sheriff) was also an important functionary. He presided at the county court along with the ealdorman and bishop, or alone in their absence; and he had to carry out the decisions of the court, levy fines, collect taxes, etc. The shires were divided into hundreds and tithings, the latter consisting of ten heads of families, who were jointly responsible to the state for the good conduct of any member of their body. For the trial and settlement of minor causes there was a hundred court held once a month. The place of the modern parliament was held by the *witena-gemot*. Its members, who were not elected, comprised the *athelings* or princes of the blood royal, the bishops and abbots, the ealdormen, the thanes, the sheriffs, etc.

One of the peculiar features of Anglo-Saxon society was the *wer-gild*, which was established for the settling of feuds. A sum, paid either in kind or in money, was placed upon the life of every freeman, according to his rank in the state, his birth, or his office. A corresponding sum was settled for every wound that could be inflicted upon his person; for nearly every injury that could be done to his civil rights, his honor, or his domestic peace, etc. From the operation of this principle no one from king to peasant was exempt.

Agriculture, including especially the raising of cattle, sheep, and swine, was the chief occupation of the Anglo-Saxons. The manufactures were naturally of small moment. Iron was made to some extent, also some cloth, and saltworks were numerous. In embroidery and working in gold the English were famous over Europe. There was a considerable trade at London, which was frequented by Normans, French, Flemings, and the merchants of the Hanse towns. The houses were rude structures, but were often richly furnished and hung with fine tapestry. The dress of the people was loose and flowing, composed chiefly of linen, and often adorned with embroidery. The men wore their hair long and flowing over their shoulders. Christianity was introduced among the Anglo-Saxons in the end of the sixth century by St. Augustine, who was sent by Pope Gregory the Great, and became the first Archbishop of Can-

terbury. Kent, then under King Ethelred, was the first place where it took root, and thence it soon spread over the rest of the country. The Anglo-Saxon Church long remained independent of Rome, notwithstanding the continual efforts of the popes to bring it into uniformity. It was not till the seventh century that this result was brought about by Theodore. Many Anglo-Saxon ecclesiastics were distinguished for learning and ability, the Venerable Bede holding the first place.

The Anglo-Saxon language, which is simply the earliest form of English, claims kinship with Dutch, Icelandic, Danish, Swedish, and German, especially with the Low German dialects (spoken in North Germany). The alphabet was substantially the same as that which we still use, except that some of the letters were different in form, while it had separate characters for the sounds of *th* in *thy* and in *thing*. Anglo-Saxon words terminated in a vowel much more frequently than the modern English, and altogether the language is so different that it has to be learned quite like a foreign tongue. Yet notwithstanding the large number of words of Latin or French origin that our language now contains, and the changes it has undergone, its framework, so to speak, is still Anglo-Saxon. Many chapters of the New Testament do not contain more than 4 per cent of non-Teutonic words, and as a whole it averages perhaps 6 or 7.

The existing remains of Anglo-Saxon literature include compositions in prose and poetry, some of which must be referred to a very early period, one or two perhaps to a time before the Angles and Saxons emigrated to England. The most important Anglo-Saxon poem is that called *Beowulf*, after its hero, extending to more than 3,000 lines. *Beowulf* is a Scandinavian prince, who slays a fiendish cannibal, after encountering supernatural perils, and is at last slain in a contest with a frightful dragon. Its scene appears to be laid entirely in Scandinavia. Its date is uncertain; parts of it may have been brought over at the emigration from Germany, though in its present form it is much later than this. The poetical remains include a number of religious poems, or poems on sacred themes; ecclesiastical narratives, as lives of saints and versified chronicles; psalms and hymns; secular lyrics; allegories, gnomes, riddles, etc. The religious class of poems was the largest, and of these *Cædmon's* (about 660) are the most remarkable. His poems consist of loose versions of considerable portions of the

Bible history. Rhyme was little used in Anglo-Saxon poetry, alliteration being employed instead, as in the older northern poetry generally. The style of the poetry is highly elliptical, and it is full of harsh inversions and obscure metaphors.

The Anglo-Saxon prose remains consist of translations of portions of the Bible, homilies, philosophical writings, history, biography, laws, leases, charters, popular treatises on science and medicine, grammars, etc. Many of these were translations from the Latin. The Anglo-Saxon versions of the Gospels, next to the Moeso-Gothic, are the earliest scriptural translations in any modern language. The Psalms are said to have been translated by Bishop Aldhelm (died 709), and also under Alfred's direction; and the Gospel of St. John by Bede; but it is not known who were the authors of the extant versions. A translation of the first seven books of the Bible is believed to have been the work of Ælfric, who was Abbot of Ensham and flourished in the beginning of the eleventh century. We have also eighty homilies from his pen, several theological treatises, a Latin grammar, etc. King Alfred was a diligent author besides being a translator of Latin works. We have under his name a translation of *De Consolatione Philosophiæ*, of Boethius, the *Universal History* of Orosius, Bede's *Ecclesiastical History*, the *Pastoral Care* of Gregory the Great, etc. The most valuable to us of the Anglo-Saxon prose is the *Anglo-Saxon Chronicle*, so called a collection of annals recording important events in the history of the country, and compiled in different religious houses. The latest text comes down to 1154. A considerable body of laws remains, as well as a large number of charters. The whole of the literature has never yet been printed.

Angola (an-gô-la), a Portuguese territory in Western Africa, south of the Congo, extending from about lat. 6° s. to lat. 17° s. (area about 500,000 sq. m.; pop. 4,000,000). It is flat and sterile on the coast, but becomes hilly or mountainous and fertile in the interior, and is watered by several streams, of which the Coanza (Kwanza) is the largest. The principal town is the seaport of St. Paul de Loanda, which was long the great Portuguese slave-mart. Exports ivory, palm-oil, coffee, hides, gum, wax, etc.

Angola Pea (*Cajanus indicus*). See Pigeon Pea.

Angora (an-gô-ra, anc. *Ancyra*), a town in the interior of Asia Minor, Turkey, 215 miles E. S. E. of Constantinople, with considerable remains of

Byzantine architecture, and relics of earlier times, both Greek and Roman, such as the remnants of the Monumentum Ancyranum, raised in honor of the Emperor Augustus. All the animals of this region are long haired, especially the goats (see Goat), sheep, and cats. The fabric mohair is manufactured from the hair of the goat and forms an important export; other exports being goatskins, dyestuffs, gums, honey and wax, etc. Estimated pop. 30,000, more than one-third of them Armenians.

Angora Cat, the large and long-haired white variety of the common cat, said to belong originally to Angora.

Angora Goat, a variety of the common goat with long silky hair. See Goat.

Angostura (an-gos-tû-ra), or CIUDAD BOLIVAR, a city of Venezuela, capital of the province of Bolivar, on the Orinoco, about 225 miles above its mouth, with governor's residence, a college, a handsome cathedral, and a considerable trade, steamers and sailing vessels ascending to the town. Exports: gold, cotton, indigo, tobacco, coffee, cattle, etc.; imports: manufactured goods, wines, flour, etc. Pop. about 10,000.

Angostura Bark, the aromatic bark obtained chiefly from *Galipica trifoliata*, a tree 10 to 20 feet high, growing in the northern regions of South America; nat. order *Rutaceæ*. The bark



Angostura-bark Tree.

is valuable as a tonic and febrifuge, and is also used for a kind of bitters. From this bark being adulterated, indeed sometimes entirely replaced, by the poisonous bark of *Strychnos Nux Vomica*, its use as a medicine has been almost given up.

Angoulême (ân-gû-lâm), an ancient town of Western France,

Angra

capital of dep. Charente, on the Charente, 60 miles N. N. E. of Bordeaux, on the summit of a rocky hill. It has a fine old cathedral, a beautiful modern town-hall, a lyceum, public library, natural history museum, hospital, lunatic asylum, etc. There are manufactures of paper, woollens, linens, distilleries, sugar-works, tanneries, etc. Pop. (1906) 30,040.

Angra (ân'grá), a seaport of Terceira, one of the Azores, with the only convenient harbor in the whole group. It has a cathedral, a military college and arsenal, etc., and is the residence of the governor-general of the Azores, and of the foreign consuls. Pop. 10,788.

Angra Pequena (ân'grá pe-ká'ná; Port. 'little bay'), a bay on the west of Namaqualand, S. Africa, where the German commercial firm Lüderitz in 1883 acquired a strip of territory and established a trading station. In 1884, notwithstanding some weak protests of the British, Germany took under her protection the whole coast territory from the Orange River to 26° S. lat., and soon after extended the protectorate to the Portuguese frontier, but not including the British settlement of Walvisch Bay.

Angri (ân'grê), a town of Southern Italy, 12 m. N. W. of Salerno, in the center of a region which produces grapes, cotton, and tobacco in great quantities. Pop. 11,281.

Anguilla (ang-wil'la). See *Eel*.

Anguilla (ang-gil'a), or **SNAKE ISLAND**, one of the British West India Islands, 60 m. N. W. of St. Kitts; about 20 m. long, with a breadth varying from 3 to 1¼ m.; area, 35 sq. m. There is a saline lake in the center, which yields a large quantity of salt. Pop. 3890.

Anguis (ang'gwis). See *Blind-worm*.

Angus (ang'gus), ancient name of Forfarshire, Scotland.

Anhalt (ân'hált), a duchy of North Germany, lying partly in the plains of the Middle Elbe, and partly in the valleys and uplands of the Lower Harz, and almost entirely surrounded by Prussia; area, 906 square miles. All sorts of grain, wheat especially, are grown in abundance; also flax, rape, potatoes, tobacco, hops, and fruit. Excellent cattle are bred. The inhabitants are principally occupied in agriculture, though there are some iron-works and manufactures of woollens, linens, beet-sugar, tobacco, etc. The dukes of Anhalt trace their origin to Bernard (1170-

1212), son of Albert the Bear. In time the family split up into numerous branches, and the territory was latterly held by three dukes (Anhalt-Köthen, Anhalt-Bernburg, and Anhalt-Dessau). In 1863 the Duke of Anhalt-Dessau became sole heir to the three duchies. The united principality is now incorporated in the German Empire, and has one vote in the Bundesrath and two in the Reichstag. Pop. 328,007, almost all Protestants. The chief towns are Dessau, Bernburg, Köthen and Zerbst.

Anholt (an'holt), an island belonging to Denmark, in the Catte-gat, midway between Jutland and Sweden, 7 m. long, 4½ broad, largely covered with drift-sand, and surrounded by dangerous banks and reefs. Pop. about 200.

Anhydride (an-hi'drid), one of a class of chemical compounds, which may be regarded as representing an acid minus the water in its composition. They were formerly called *anhydrous acids*.

Anhydrite (an-hi'drit), *anhydrous sulphate of calcium*, a mineral presenting several varieties of structure and color. The *vulpinite* of Italy possesses a granular structure, resembling a coarse-grained marble, and is used in sculpture. Its color is grayish white, intermingled with blue.

Ani (â'nê), a ruined city in Russian Armenia, formerly the residence of the Armenian dynasty of the Bagratids, having in the eleventh century a pop. of 100,000; in the thirteenth century destroyed by the Mongols.

Aniene (â-nê-â'nâ). See *Anio*.

Aniline (an'i-lin), a substance of importance as the basis of a number of brilliant and durable dyes. It is found in small quantities in coal-tar, but the aniline of commerce is obtained from benzene or benzole, a constituent of coal-tar, consisting of hydrogen and carbon. Benzene, when acted on by *nitric acid*, produces nitrobenzene; and this substance again, when treated with nascent hydrogen, generally produced by the action of acetic acid upon iron filings or scraps, yields aniline. It is a colorless, oily liquid, somewhat heavier than water, with a peculiar vinous smell and a burning taste. Its name is derived from *anil*, the Portuguese and Spanish name for indigo, from the dry distillation of which substance it was first obtained by the chemist Unverdorben in 1826. When acted on by certain chemicals, such as arsenic, bichromate of potassium, etc., aniline produces a great variety of compounds, many of which are possessed of very beau-

Aniline

tiful colors, and are known by the names of aniline purple, aniline green, roseine, violine, bleu de Paris, magenta, etc. The manufacture of these aniline or coal-tar dyes as a branch of industry was introduced in 1856 and has since grown large.

Anilism (an'i-lism), aniline poisoning, a name given to the aggregate of symptoms which often show themselves in those employed in aniline works, resulting from the inhalation of aniline vapors. It may be either acute or chronic. In a slight attack of the former kind, the lips, cheeks, and ears become of a bluish color, and the person's walk may be unsteady; in severe cases there is loss of consciousness. Chronic anilism is accompanied by derangement of the digestive organs and of the nervous system, headaches, eruptions on the skin, muscular weakness, etc.

Animal (an'i-mal), an organized and sentient living being. Life in the earlier periods of natural history was attributed almost exclusively to animals. With the progress of science, however, it was extended to plants. In the case of the higher animals and plants there is no difficulty in assigning the individual to one of the two great kingdoms of organic nature, but in their lowest manifestations the vegetable and animal kingdoms are brought into such immediate contact that it becomes almost impossible to assign them precise limits, and to say with certainty where the one begins and the other ends. From form no absolute distinction can be fixed between animals and plants. Many animals, such as the sea-shrubs, sea-mats, etc., so resemble plants in external appearance that they were, and even yet popularly are, looked upon as such. With regard to *internal structure* no line of demarkation can be laid down, all plants and animals being, in this respect, fundamentally similar; that is, alike composed of molecular, cellular, and fibrous tissues. Neither are the chemical characters of animal and vegetable substances more distinct. Animals contain in their tissues and fluids a larger proportion of nitrogen than plants, while plants are richer in carbonaceous compounds than the former. In some animals, moreover, substances almost exclusively confined to plants are found. Thus the outer wall of Sea-squirts contains *cellulose*, a substance largely found in plant-tissues; while *chlorophyll*, the coloring-matter of plants, occurs in Hydra and many other lower animals. *Power of motion*, again, though broadly distinctive of animals, cannot be said to be absolutely characteristic of them. Thus many animals, as oysters, sponges,

corals, etc., in their mature condition are rooted or fixed, while the embryos of many plants, together with numerous fully developed forms, are endowed with locomotive power by means of vibratiles, hair-like processes called cilia. The distinctive points between animals and plants which are most to be relied on are those derived from the *nature and mode of assimilation of the food*. Plants feed on *inorganic matters* consisting of water, ammonia, carbonic acid, and mineral matters. They can take in only food which is presented to them in a *liquid or gaseous* state. The exceptions to these rules are found chiefly in the case of plants which live *parasitically* on other plants or on animals, in which cases the plant may be said to feed on organic matters, represented by the juices of their hosts. Animals, on the contrary, require *organized* matters for food. They feed either upon plants or upon other animals. But even carnivorous animals can be shown to be dependent upon plants for subsistence; since the animals upon which Carnivora prey are in their turn supported by plants. Animals, further, can subsist on *solid* food in addition to liquids and gases; but many animals (such as the tapeworms) live by the mere imbibition of fluids which are absorbed by their tissues, such forms possessing no distinct digestive system. Animals require a due supply of *oxygen gas* for their sustenance, this gas being used in respiration. Plants, on the contrary, require *carbonic acid*. The animal exhales or gives out carbonic acid as the part result of its tissue-waste, while the plant taking in this gas is enabled to decompose it into its constituent carbon and oxygen. The plant retains the former for the uses of its economy, and liberates the oxygen, which is thus restored to the atmosphere for the use of the animal. All animals possess a certain amount of heat or temperature which is necessary for the performance of vital action. The only classes of animals in which a constantly-elevated temperature is kept up are birds and mammals. The bodily heat of the former varies from 100° F. to 112° F., and of the latter from 96° F. to 104° F. The mean or average heat of the human body is about 99° F., and it never falls much below this in health. The animals lower in organization than birds are named 'cold-blooded,' this term meaning in its strictly physiological sense that their temperature is usually that of the medium in which they live, and that it varies with that of the surrounding medium. 'Warm-blooded' animals, on the contrary, do not exhibit such variations.

but mostly retain their normal temperature in any atmosphere. The cause of the evolution of heat in the animal body is referred to the union (by a process resembling ordinary combustion) of the carbon and hydrogen of the system with the oxygen taken in from the air in the process of respiration. The details of animal organization will be treated under appropriate headings.

Animal Chemistry. the department of organic chemistry which investigates the composition of the fluids and the solids of animals, and the chemical action that takes place in animal bodies. There are four elements, sometimes distinctively named *organic elements*, which are invariably found in living bodies,—viz., carbon, hydrogen, oxygen, and nitrogen. To these may be added, as frequent constituents of the human body, sulphur, phosphorus, lime, sodium, potassium, chlorine, and iron. The four organic elements are found in all the fluids and solids of the body. Sulphur occurs in blood and in many of the secretions. Phosphorus is also common, being found in nerves, in the teeth, and in fluids. Chlorine occurs in almost all parts of the body; lime is found in bone, in the teeth, and in the secretions; iron occurs in the blood, in urine, and in bile; and sodium, like chlorine, is of common occurrence. Potassium occurs in muscles, in nerves, and in the blood-corpuscles. Minute quantities of copper, silicon, manganese, lead, and lithium are also found in the human body. The compounds formed in the human organism are divisible into the organic and inorganic. The most frequent of the latter is water, of which two-thirds (by weight) of the body is composed. The organic compounds may, like the *foods* from which they are formed, be divided into the nitrogenous and non-nitrogenous. Of the former the chief are albumen (found in blood, lymph, and chyle), casein (found in milk), myosin (in muscle), gelatin (obtained from bone), and others. The non-nitrogenous compounds are represented by organic acids, such as formic, acetic, butyric, stearic, etc.; by animal starches, sugars; and by fats and oils, as stearin and olein.

Animalcule (an-i-mal'kūl), a general name given to many forms of animal life from their minute size. We thus speak of the Infusorian Animalcules among the Protozoa, of the Rotifera or Wheel Animalcules, etc., but the term is not now used in zoölogy in any strict significance, nor is it employed in classification.

Animal Heat. See *Animal*.

Animal Magnetism. See *Mesmerism*.

Animals, CRUELTY TO, an offense against which societies have been formed and laws passed in various countries. Societies for prevention of cruelty to animals are in operation in all the states of the American Union. The first was chartered in New York in 1866, with Henry Bergh, president, whose efforts to extend its powers were untiring. See also *Vivisection*.

Animal Worship, a practice found to prevail, or to have prevailed, in the most widely distant parts of the world, both the Old and the New, but nowhere to such an amazing extent as in ancient Egypt, notwithstanding its high civilization. Nearly all the more important animals found in the country were regarded as sacred in some part of Egypt, and the degree of reverence paid to them was such that throughout Egypt the killing of a hawk or an ibis, whether voluntary or not, was punished with death. The worship, however, was not, except in a few instances, paid to them as actual deities. The animals were merely regarded as sacred to the deities, and the worship paid to them was symbolical.

An'ima Mun'di (L., 'the soul of the world'), a term applied by some of the older philosophers to the ethereal essence or spirit supposed to be diffused through the universe, organizing and acting throughout the whole and in all its different parts; a theory closely allied to *Pantheism*.

Anime (an'i-mā), a resin supposed to be obtained from the trunk of an American tree (*Hymenaea Courbaril*). It is of a transparent amber color, has a light, agreeable smell, and is soluble in alcohol. It strongly resembles copal, and, like it, is used in making varnishes. Also a name of other resins.

Animism (an'im-izm), the system of medicine propounded by Stahl, and based on the idea that the soul (*anima*) is the seat of life. In modern usage the term is applied to express the general doctrine of souls and other spiritual beings, and especially to the tendency, common among savage races, to explain all the phenomena in nature not due to obvious natural causes by attributing them to spiritual agency. Among the beliefs most characteristic of animism is that of a human apparitional soul, bearing the form and appearance of the body, and living after death a sort of semi-human life.

Anio (a'nio; now *Antena* or *Tevere*), a river in Italy, a tributary of the Tiber, which it enters from the east a short distance above Rome, renowned for the natural beauties of the valley through which it flows, and for the remains of ancient buildings there situated. Its beautiful cascade at Tivoli is celebrated by the poets.

Anise (an'is; *Pimpinella anisum*), an annual plant of the natural order Umbelliferae, a native of the Levant, and cultivated in Spain, France, Italy, Malta, etc., whence the fruit, popularly called *aniseed*, is imported. This fruit is ovate, with ten narrow ribs, between which are oil-vessels. It has an aromatic smell, and is largely employed to flavor liqueurs (aniseed or anisette), sweetmeats, etc. *Star-anise* is the fruit of an evergreen Asiatic tree (*Illicium anisatum*) of the natural order Magnoliaceae, and is brought chiefly from China. Its flavor is similar to that of anise, and it is used for the same purposes. An essential oil is obtained from both kinds of anise, and is used in the preparation of cordials, for scenting soaps, etc.

Aniseed. See *Anise*.

Anisette (an'i-set), a liqueur flavored with spirit of anise; also called *aniseed*.

Anjou (an-shö), an ancient province of France, now forming the department of Maine-et-Loire, and parts of the departments of Indre-et-Loire, Mayenne, and Sarthe; area, about 3,000 sq. miles. In 1090 the province passed into the hands of the house of Gatinails, of which sprang Count Godfrey V, who, in 1127, married Matilda, daughter of Henry I of England, and so became the ancestor of the Plantagenet kings. Anjou remained in the possession of the English kings up to 1204, when John lost it to the French king Phillip Augustus. In 1246 Louis IX bestowed this province on his son Charles; but in 1328 it was reunited to the French crown. John I raised it to the rank of a ducal peerage, and gave it to his son Louis. Subsequently it remained separate from the French crown till 1480, when it fell to Louis XI.

Ankarström (an'kar-streum), JAN JAKOB, the murderer of Gustavus III of Sweden, was born about 1762, and was at first a page in the Swedish court, afterwards an officer in the royal body-guards. He was a strenuous opponent of the sovereign's measures to restrict the privileges of the nobility, and joined Counts Horn and Ribbing and others in a plot to assassinate Gustavus.

The assassination took place on the 18th March, 1792. Ankarström was tried, tortured, and executed in April, dying boasting of his deed.

Anker (ang'ker), an obsolete measure used in Britain for spirits, beer, etc., containing $8\frac{1}{4}$ imperial gallons. A measure of similar capacity was used in Germany and elsewhere in Europe.

Anklam (an'kläm), a town in Prussia, province of Pomerania, 47 miles N.W. of Stettin, on the river Peene, which is here navigable. Ship-building, woolen and cotton manufactures, soap-boiling, tanning, etc., are carried on. Pop. 14,002.

Ankle (ang'kl). See *Foot*.

Ankobbar (an-kö'bar), or ANKOBER, a town in Abyssinia, capital of Shoa, on a steep conical hill 8,200 feet high. Pop. 6,000.

Ankylosis (ang'ki-lö-sis), or ANCHYLOSIS, stiffness of the joints caused by a more or less complete coalescence of the bones through ossification, often the result of inflammation or injury. False ankylosis is stiffness of a joint when the disease is not in the joint itself, but in the tendinous and muscular parts by which it is surrounded.

Anna (an'a), an Anglo-Indian money of account, the sixteenth part of a rupee, and of the value of three cents.

Annaberg (än'nä-berg), a town in Saxony, 47 miles S.W. of Dresden. Mining (for silver, cobalt, iron, etc.) is carried on, and there are manufactures of lace, ribbons, fringes, buttons, etc. Pop. (1906) 16,811.

Anna Comnena (com-ne'na), daughter of Alexius I Comnenus, Byzantine emperor. She was born 1083, and died 1148. After her father's death she endeavored to secure the succession to her husband, Nicephorus Briennius, but was baffled by his want of energy and ambition. She wrote (in Greek) a life of her father Alexius, which, in the midst of much fulsome panegyric, contains some valuable and interesting information. She forms a character in Sir Walter Scott's *Count Robert of Paris*.

Anna Ivanovna (ä-vli-nov'-nit), Empress of Russia; born in 1693, the daughter of Ivan, the elder half-brother of Peter the Great. She was married in 1710 to the Duke of Courland, in the following year was left a widow, and in 1730 ascended the throne of the czars on the condition proposed by the senate, that she would limit the absolute power of the czars, and

do nothing without the advice of the council composed of the leading members of the Russian aristocracy. But no sooner had she ascended the throne than she declared her promise null, and proclaimed herself autocrat of all the Russias. She chose as her favorite Ernest Johann Biren or Biron, who was soon all powerful in Russia, and ruled with great severity. Several of the leading nobles were executed, and many thousand men exiled to Siberia. In 1737 Anna forced the Courlanders to choose Biren as their duke, and nominated him at her death regent of the empire during the minority of Prince Ivan (of Brunswick). Anna died in 1740. See *Biren*.

Annals (an'als), a history of events in chronological order, each event being recorded under the year in which it occurred. The name is derived from the first annual records of the Romans, which were called *annales pontificum* or *annales maximi*, drawn up by the *pontifex maximus* (chief pontiff). The practice of keeping such annals was afterwards adopted also by various private individuals, as by Fabius Pictor, Calpurnius Piso, and others. The name hence came to be applied in later times to historical works in which the matter was treated with special reference to chronological arrangement, as to the *Annals of Tacitus*.

Annam (an-nam'), See *Anam*.

Annamaboe (a-ná-má-bó'), a seaport in Western Africa, on the Gold Coast, 10 miles east of Cape Coast Castle, with some trade in gold dust, ivory, palm-oil, etc. Pop. 5000.

Annan (an'nan), a royal and parliamentary burgh in Scotland, on the Annan, a little above its entrance into the Solway Firth, one of the Dumfries district of burghs. Pop. 5804.—The river ANNAN is a stream 40 miles long running through the central division of Dumfriesshire, to which it gives the name of ANNANDALE.

Annapolis (an-nap'o-lis), the capital of Maryland, on the Severn, near its mouth in Chesapeake Bay, 40 miles E. of Washington. It contains a college (St. John's), a state-house, and the United States naval academy, which was established here in 1845. Oyster-packing is the chief industry. Pop. 8609. See *Naval Academy*.

Annapolis, formerly called **ROYAL**, a small town in Nova Scotia, on an inlet of the Bay of Fundy, a tidal port, open all the year. It is the oldest European settlement in this part of America, dating

from 1604. Settled by the French, it was taken by the English during the colonial wars and renamed after Queen Anne. Pop. (1911) 1020.

Ann Arbor, county-seat of Washtenaw Co., Michigan, 33 miles W. of Detroit. Here is situated the University of Michigan, one of the most flourishing State universities in the country. It is in a pleasant, elevated situation, and has important manufactures of furniture, agricultural implements, engines, boilers, etc. Pop. 14,817.

Annates (an'nátes), a year's income claimed for many centuries by the pope on the death of any bishop, abbot, or parish priest, to be paid by his successor. In England they were at first paid to the Archbishop of Canterbury, but were afterwards appropriated by the popes. In 1532 the Parliament gave them to the crown; but Queen Anne restored them to the church by applying them to the augmentation of poor livings.

Annatto, **ARNOTTO** (a-not-tó), an orange-red coloring matter, obtained from the pulp surrounding the seeds of *Bixa Orellana*, a shrub native to tropical America, and cultivated in Guiana, St. Domingo, and the East Indies. It is sometimes used as a dye for silk and cotton goods, though it does not produce a very durable color, but it is much used in medicine for tinting plasters and ointments, and to a considerable extent by farmers for giving a rich color to cheese.

Anne (an), Queen of Great Britain and Ireland, was born at Twickenham, near London, 6th February, 1664. She was the second daughter of James II, then Duke of York. In 1683 she was married to Prince George, brother to



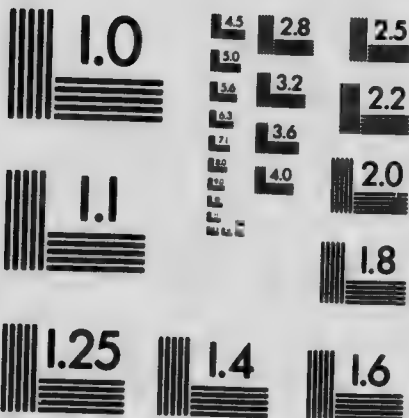
Queen Anne.

King Christian V. of Denmark. On the arrival of the Prince of Orange in 1688, Anne wished to remain with her father; but she was prevailed upon by Lord



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Churchill (afterwards Duke of Marlborough) and his wife to join the triumphant party. After the death of William III in 1702 she ascended the English throne. Her character was essentially weak, and she was governed first by Marlborough and his wife, and afterwards by Mrs. Masham. Most of the principal events of her reign are connected with the war of the Spanish Succession. The only important acquisition that England made by it was Gibraltar, which was captured in 1704. Another very important event of this reign was the union of England and Scotland under the name of Great Britain, which was accomplished in 1707. She seems to have long cherished the wish of securing the succession to her brother James, but this was frustrated by the internal dissensions of the cabinet. Grieved at the disappointment of her secret wishes, she fell into a state of weakness and lethargy, and died, July 20, 1714.

Anne (or AUSTRIA), daughter of Philip III of Spain, was born at Madrid in 1601, and in 1615 was married to Louis XIII of France. Richelieu fearing the influence of her foreign connections, did everything he could to humble her. In 1643 her husband died, and she was left regent, but placed under the control of a council. But the Parliament overthrew this arrangement, and entrusted her with full sovereign rights during the minority of her son, Louis XIV. She, however, brought upon herself the hatred of the nobles by her boundless confidence in Cardinal Mazarin, and was forced to flee from Paris during the wars of the Fronde. She ultimately quelled all opposition, and was able in 1661 to transmit to her son unimpaired the royal authority. She spent the remainder of her life in retirement, and died January 20, 1666.

Annealing (an-el'ing), a process to which many articles of metal and glass are subjected after making, in order to render them more tenacious, and which consists in heating them and allowing them to cool slowly. When the metals are worked by the hammer, or rolled into plates, or drawn into wire, they acquire a certain amount of brittleness, which destroys their usefulness, and has to be remedied by annealing. In working tool steel the metal is made workable by annealing. It is particularly employed in glass-houses, and consists in putting the glass vessels, as soon as they are formed and while they are yet hot, into a furnace or oven, in which they are suffered to cool gradually. The toughness is greatly increased by cooling the articles in oil.

Annecy (an-sè), an ancient town in France, department of Haute-Savoie, situated on the Lake of Annecy, 21 miles s. of Geneva; contains a cathedral and a ruinous old castle, once the residence of the counts of Genevois; manufactures of cotton, leather, paper, and hardware. Pop. 10,763.—The lake is about 9 miles long and 2 broad.

Annelida (a-nel'i-da), an extensive division or class of An-

nulosa or articulate animals, so called because their bodies are formed of a great number of small rings. The earthworm, the lobworm, the nereis, and the leech belong to this division.



Annelida.

1, Leech (*Sanguisuga officinalis*). 2, *Syllis monilaris*. 3, Portion of same.

Anniston (an'nis-ton), a thriving town, capital of Calhoun County, Alabama, 65 miles E. of Birmingham; with an altitude of 1000 feet. Here are extensive blast furnaces, cast-iron pipe foundries, cotton mills, etc. It is a trade center for cotton. Pop. 12,794.

Annobon (an-no-bōn'), or ANNORON, a beautiful Spanish island of Western Africa, south of the Bight of Biafra, about 4 miles long by 2 miles broad, and rising abruptly to the height of 3,000 feet, richly covered with vegetation. Pop. about 3000.

Annonay (an-o-nā), a town in Southern France, department of Ardèche, 37 miles s. s. w. of Lyons, in a picturesque situation. It is the most important town of Ardèche, manufacturing paper and glove leather to a large extent, also cloth, felt, silk stuffs, gloves, hosiery, etc. There is an obelisk in memory of Joseph Montgolfier of balloon fame, a native of the town. Pop. (1906) 15,403.

Annotto. See Annatto.

Annual (an'ū-al), in botany, a plant that springs from seed, grows up, produces seed, and then dies, all within a single year or season.

An'nual, in literature, the name given to a class of gift-books which flourished between 1820 and 1860 and were distinguished by great magnificence both of binding and illustration. Their contents were chiefly prose tales and ballads, lyrics and other poetry. Annuals to-day are usually year-books of practical information.

Annuity (a-nū'i-ti), a sum of money paid annually to a person, and continuing either a certain number

of years, or for an uncertain period, to be determined by a particular event, as the death of the recipient or annuitant, or that of the party liable to pay the annuity; or the annuity may be perpetual. The payments are made at the end of each year, or at other periods. The rules and principles by which the present value of an annuity is to be computed have been the subjects of careful investigation. The present value of an annuity for a limited period is a sum which, if put at interest, will at the end of that period give an amount equal to the sum of all the payments of the annuity and interest; and, accordingly, if it be proposed to invest a certain sum of money in the purchase of an annuity for a given number of years the comparative value of the two may be precisely estimated, the rate of interest being given. But annuities for uncertain periods, and particularly life annuities, are more frequent, and the value of the annuity is computed according to the probable duration of the life by which it is limited. If a person having a certain capital, and intending to spend this capital and the income of it during his own life, could know precisely how long he should live, he might lend this capital at a certain rate during his life, and by taking every year, besides the interest, a certain amount of the capital, he might secure the same annual amount for his support during his life in such manner that he should have the same sum to spend every year, and consume precisely his whole capital during his life. But since he does not know how long he is to live he agrees with an annuity office to take the risk of the duration of his life, and agree to pay him a certain annuity during his life in exchange for the capital which he proposes to invest in this way. The probable duration of his life, therefore, becomes a subject of computation; and for the purpose of making this calculation tables of longevity are made by noting the proportions of deaths at certain ages in the same country or district. In Great Britain the government grants annuities, but in the United States the granting of annuities is confined to private companies or corporations. The following are the approved rates of a well-managed company: In consideration of \$1000 paid to a company the annuity granted to a male aged 40 would be \$57.64; aged 45, \$62.77; aged 50, \$69.59; aged 55, \$78.68; aged 60, \$90.99; aged 65, \$107.87; aged 70, \$131.23; aged 75, \$160.00; aged 80, \$183.49. The purchase of annuities, as a system, has never gained much foothold in America—the endowment plan of life insurance, by

which after the lapse of a term of years the insured receives a sum in bulk, being preferred.

Annuloida (an-ū-lōi'da), in some modern zoological classifications, a division (sub-kingdom) of animals, including the Rotifera, Scolecida (tapeworms, etc.), all which are more or less ring-like in appearance, and the Echinodermata, whose embryos show traces of annulation.

Annulosa (an-ū-lō'sa), a division (sub-kingdom) of animals regarded by some as synonymous with the Arthropoda or Articulata; according to other systematists, including both the Articulata and Annulata or worms.

Annunciation (a-nun-shi-ā'shun), the declaration of the angel Gabriel to the Virgin Mary informing her that she was to become the mother of our Lord.—*Annunciation* or *Lady Day* is a feast of the church in honor of the annunciation, celebrated on the 25th of March.—The Italian order of *Knights of the Annunciation* was instituted by Amadeus VI, Duke of Savoy, in 1360. The king is always grand-master. The knights must be of high rank, and must already be members of the order of St. Mauritius and St. Lazarus.—There are two orders of *nuns of the Annunciation*, one originally French, founded in 1501 by Joanna of Valois, the other Italian, founded in 1604 by Maria Vittoria Fornari of Genoa.

Anoa (an'o-a), an animal (*Anoa depressicornis*) closely allied to the buffalo, about the size of an average sheep, readily domesticated, inhabiting the rocky and mountainous localities of the island of Celebes. The horns are straight, thick at the root, and set nearly in a line with the forehead.

Anobium (a-nō'bi-um), a genus of coleopterous insects, the larvæ of which often do much damage by their boring into old wood, including several known by the name of *death-watch*. *A. striatum*, a common species, when frightened, is much given to feigning death.

Anode (an'ōd; Gr. *ana*, up, *hodos*, way), the positive pole of the voltaic current, being that part of the surface of a chemically decomposing body which the electric current enters; opposed to *cathode* (Gr. *kata*, down, *hodos*, way), the way by which it departs.

Anodon (an'o-don), **ANODON'TA**, a genus of lamellibranchiate bivalves, including the fresh-water mussels, without or with very slight hinge-teeth. See *Mussel*.

Anodyne (an'o-din), a medicine, such as an opiate or narcotic, which allays pain.

Anointing (a-noint'ing), rubbing the body or some part of it with oil, often perfumed. From time immemorial the nations of the East have been in the habit of anointing themselves for the sake of health and beauty. The Greeks and Romans anointed themselves after the bath. Wrestlers anointed themselves in order to render it more difficult for their antagonists to get hold of them. In Egypt it seems to have been common to anoint the head of guests when they entered the house where they were to be entertained, as shown in the cut. In the Mosaic law a sacred character was attached to the anointing of the garments of the priests and things belonging to the ceremonial of worship. The Jewish priests and kings were anointed when inducted into office, and were called the *anointed of the Lord*, to show that their persons were sacred and their office from God. In the Old Testament also the prophecies respecting the Redeemer style him *Messias*, that is, the *Anointed*, which is also the meaning of his Greek name Christ. The custom of anointing still exists in the Roman Catholic Church in the ordination of priests and the confirmation of believers and the sacrament of extreme unction. The ceremony is also frequently a part of the coronation of kings.



Egyptian anointing a Guest.

Anomalure (a-nom'a-lur; *Anomalurus*), a genus of rodent animals inhabiting the west coast of Africa, resembling the flying-squirrels, but having the under surface of the tail 'furnished for some distance from the roots with a series of large horny scales, which, when pressed against the trunk of a tree, may subserve the same purpose as those instruments with which a man climbs up a telegraph pole to set the wires.' They are called also scale-tails, or scale-tailed squirrels, but some authorities class them with the porcupines rather than the squirrels. There are several species of them, but little is known of their habits.

Anomaly (a-nom'a-li), in astronomy, the angle which a line drawn from a planet to the sun has

passed through since the planet was last at its perihelion or nearest distance to the sun. The *anomalous year* is the interval between two successive times at which the earth is in perihelion, or 365 days 6 hours 13 minutes 45 seconds. In consequence of the advance of the earth's perihelion among the stars in the same direction as the earth's motion and of the precession of the equinoxes, which carries the equinoxes back in the opposite direction to the earth's motion, the anomalous year is longer than the sidereal year, and still longer than the tropical or common year.

Anomura (a-no-mu'ra), a section of the crustaceans of the order Decapoda, with irregular tails not formed to assist in swimming, including the hermit-crabs and others.

Anona (a-no'na), a genus of plants, the type of the nat. order Anonaceæ. *A. squamosa* (sweet-sop) grows in the West Indian Islands, and yields an edible fruit having a thick, sweet, luscious pulp. *A. muricata* (sour-sop) is cultivated in the West and East Indies; it produces a large pear-shaped fruit, of a greenish color, containing an agreeably slightly acid pulp. The genus produces other edible fruits, as the common custard-apple or bullock's heart, from *A. reticulata*, and the cherimoyer of Peru, from *A. Cherimolia*.



Anona or Sour-sop (*Anona muricata*).

Anonaceæ (a-no-na'ce-e), a natural order of trees and shrubs, having simple, alternate leaves, destitute of stipules, by which character they are distinguished from the Magnoliaceæ, to which they are otherwise closely allied. They are mainly tropical plants of the Old and the New World, and are generally aromatic. See *Anona*.

Anonymous (a-non'i-mus), literally 'without name,' applied to anything which is the work of a person whose name is unknown or who keeps his name secret. *Pseudonym* is a term used for an assumed name. The knowledge of the anonymous and pseudonymous literature is indispensable to the bibliographer, and large dictionaries giving the titles and

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Anoplotherium

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Anoplotherium (an-a-plō-thē'ri-um), an extinct genus of the Ungulata or Hoofed Quadrupeds, forming the type of a distinct family, which were in many respects intermediate between the swine and the true ruminants. These animals were pig-like in form, but possessed long tails, and had a cleft hoof, with two rudimentary toes. The remarkable dental development, which differs from all other ungulates extinct or recent, consists of six incisors, two canines, eight premolars, and six molars, present in each jaw, the series being continuous. *A. commune*, from the Eocene rocks, is a familiar species.

Anoplura (an-o-plū'ra), an order of apterous insects, of which the type is the genus *Pediculus* or louse.

Anopshehr. See *Anupshahr*.

Anorexia. See *Appetite*.

Anosmia (an-os'mi-a), a disease consisting in a diminution or destruction of the power of smelling, sometimes constitutional, but most frequently caused by strong and repeated stimulants, as snuff, applied to the olfactory nerves.

Anoura. See *Anura*.

Anquetil-Duperron (ānk-tēl-dū-pā-ron), ABRAHAM HYACINTHE, a French orientalist, born in 1731, died in 1805. He studied theology for some time, but soon devoted himself to the study of Hebrew, Arabic, and Persian. His zeal for the Oriental languages induced him to set out for India, where he prevailed on some of the Parsee priests to instruct him in the Zend and Pehlevi and to give him some of the Zoroastrian books. In 1762 he returned to France with a valuable collection of MSS. In 1771 he published his *Zend-Avesta*, a translation of the *Vendidad*, and other sacred books, which excited great sensation. Among his other works are *L'Inde en Rapport avec l'Europe* (1790), and a selection from the *Vedas*. His knowledge of the Oriental languages was by no means exact.

Ansbach. See *Anspach*.

Anselm (ān'selm) ST., a celebrated Christian philosopher and theologian, born at Aosta, in Piedmont, in 1033; died at Canterbury 1109. At the age of twenty-seven (1060) he became a monk at Bec, in Normandy, whither he had been attracted by the celebrity of Lanfranc. Three years later he was

Ansgar

elected prior, and in 1078 he was chosen abbot, which he remained for fifteen years. During this period of his life he wrote his first philosophical and religious works; the dialogues on Truth and Free-will, and the treatises *Monologion* and *Proslogion*; and at the same time his influence made itself so felt among the monks under his charge that Bec became the chief seat of learning in Europe. In 1093 Anselm was offered by William Rufus the archbishopric of Canterbury, and accepted it, though with great reluctance, and with the condition that all the lands belonging to the see should be restored. William II soon quarreled with the archbishop, who would show no subservience to him, and would persist in acknowledging Pope Urban in opposition to the antipope Clement. William ultimately had to give way, acknowledging Urban and conferring the pallium upon Anselm. The king became his bitter enemy, however, and so great were Anselm's difficulties that in 1097 he set out for Rome to consult with the pope. Urban received him with great distinction, but did not venture really to take the side of the prelate against the king, though William had refused to receive Anselm again as archbishop, and had seized on the revenues of the see of Canterbury, which he retained till his death in 1100. Anselm accordingly remained abroad, where he wrote most of his celebrated treatise on the atonement, entitled, *Cur Deus Homo* ('Why God was made Man;') translated into English, Oxford, 1858). When William was succeeded by Henry I Anselm was recalled; but Henry insisted that he should submit to be reinvested in his see by himself, although the popes claimed the right of investing for themselves alone. Much negotiation followed, and Henry did not surrender his claims till 1107, when Anselm's long struggle on behalf of the rights of the church came to an end. Anselm was a great scholar, a deep and original thinker, and a man of the utmost saintliness and piety. The chief of his writings are the *Monologion*, the *Proslogion*, and the *Cur Deus Homo*. The first is an attempt to prove inductively the existence of God by pure reason without the aid of Scripture or authority; the second is an attempt to prove the same by the deductive method; the *Cur Deus Homo* is intended to prove the necessity of the incarnation. Among his numerous other writings are more than 400 letters. His life was written by his domestic chaplain and companion, Eadmer, a monk of Canterbury.

Ansgar, or ANSKAR (ān'skār), called the *Apostle of the North*, was

born in 801 in Picardy, and he took the monastic vows while still in his boyhood. In the midst of many difficulties he labored as a missionary in Denmark and Sweden, dying in 864 or 865, with the reputation of having undertaken, if not the first, the most successful attempts for the propagation of Christianity in the North.

An'son, GEORGE, LORD, a celebrated English navigator; born 1697, died 1762. He entered the navy at an early age and became a commander in 1722, and captain in 1724. In 1740 he was made commander of a fleet sent to the South Sea, directed against the trade and colonies of Spain. The expedition consisted of five men-of-war and three smaller vessels, which carried 1400 men. After much suffering and many stirring adventures he reached the coast of Peru, made several prizes, and captured and burned the city of Palta. His squadron was now reduced to one ship, the *Centurion*, but with it he took the Spanish treasure galleon from Acapulco, and arrived in England in 1744, with treasure to the amount of \$2,500,000, having circumnavigated the globe. His adventures and discoveries are described in the well-known *Anson's Voyage*, compiled from materials furnished by Anson. A few days after his return he was made rear-admiral of the blue, and not long after rear-admiral of the white. His victory over the French admiral Jonquière, near Cape Finisterre in 1747, raised him to the peerage, with the title of Baron of Soberton. Four years later he was made first lord of the admiralty. In 1758 he commanded the fleet before Brest, protected the British at St. Malo, Cherbourg, etc., and received the repulsed troops into his vessels.

Ansonia (an-so'ni-a), a city of Connecticut, on the Naugatuck River, 12 miles N. W. of New Haven. Has manufactures of brass and copper goods, heavy machinery, electrical goods, etc. Pop. 15,152.

Anspach (an'späh), or ANSBACH, a town in Bavaria, at the junction of the Holzbach with the Lower Rezat, 24 miles southwest of Nürnberg. Anspach gave its name to an ancient principality or margravate, ruled by members of the house of Hohenzollern. It was united with Bayreuth in 1769, acquired by Prussia in 1791-92, ceded to Bavaria by Prussia in 1805, occupied by France in 1806, and ceded to Bavaria in 1810. The industries of the modern town consist of manufactures of trimmings, buttons, straw-ware, etc. Pop. 17,555.

Ansted (an'sted), **DAVID THOMAS**, an English geologist, born in 1814, died in 1880. He was professor of geology at King's College, London, and assistant secretary to the Geological Society, whose quarterly journal he edited for many years. His writings on geology were standard authorities.

Anster (an'-ster), **JOHN**, professor of civil law in the University of Dublin, born in County Cork in 1793; died in 1867. He published a volume of poems, and was a frequent contributor to *Blackwood's Magazine*, the *Dublin University Magazine*, the *North British Review*, etc., but is chiefly known by his fine translation of Goethe's *Faust*, 1835-64.

Anstey (an'stè), **CHRISTOPHER**, an English poet, born 1724, died 1805. He was author of *The New Bath Guide*, a humorous and satirical production describing fashionable life at Bath in the form of a series of letters in different varieties of meter, which had a great reputation in its day.

Anstey, F. See *Guthrie, Thomas Anthony*.

Anstruther (an'struth-ér; popularly an'stér), **EASTER** and **WESTER**, two small royal and parliamentary burghs of Scotland, in Fifeshire, forming, with the contiguous royal burgh of Collardye or Nether Killyrenny, one fishing and seaport town. Pop. 1,663.

Ant, the common name of hymenopterous (or membranous-winged) insects of various genera, of the family Formicidæ, found in most temperate and tropical regions. They are small but powerful insects, and have long been noted for their remarkable intelligence and interesting habits. They live in communities regulated by definite laws, each member of the society bearing a well-defined and separate part in the work of the colony. Each community consists of males; of females much larger than the males; and of barren females, otherwise called neuters, workers, or nurses. The neuters are wingless, and the males and females only acquire wings for their 'nuptial flight,' after which the males perish, and the few females which escape the pursuit of their numerous enemies divest themselves of their wings, and either return to established nests or become the foundresses of new colonies. The neuters perform all the labors of the ant-hill or abode of the community; they excavate the galleries, procure food, and feed the larvæ or young ants, which are destitute of organs of motion. In fine weather they carefully convey them to the surface for

the benefit of the sun's heat, and as attentively carry them to a place of safety either when bad weather is threatened or the ant-hill is disturbed. In like manner they watch over the safety of the nymphs or pupæ about to acquire their perfect growth. Some communities possess a special type of neuters, known as 'soldiers,' from the duties that specially fall upon them, and from their powerful biting jaws. There is a very considerable variety in the materials, size, and form of ant-hills, or nests, according to the peculiar nature or instinct of the species. Most of American ants form nests in woods, fields, or gardens, their abodes

their nests. It has been observed that some species, like the Sanguinary Ant (*Formica sanguinea*), resort to violence to obtain working ants of other species for their own use, plundering the nests of suitable kinds of their larvæ and pupæ, which they carry off to their own nests to be carefully reared and kept as slaves. In temperate countries male and female ants survive, at most, till autumn, or to the commencement of cool weather, though a very large proportion of them cease to exist long previous to that time. The neuters pass the winter in a state of torpor, and of course require no food. The only time when they require food

is during the season of activity, when they have a vast number of young to feed. Some ants of Southern Europe feed on grain, and store it up in their nests for use when required. Some species have stings as weapons, others only their powerful mandibles, or an acrid and pungent fluid (formic acid) which they can emit. The name white ant is given to the neurop-



Antananarivo.

being generally in the form of small mounds rising above the surface of the ground and containing numerous galleries and apartments. Some excavate nests in old tree-trunks. Houses built by the common wood-ant (*Formica rufa*) are frequently as large as a small hay-cock. Some ants live on animal food, very quickly picking quite clean the skeleton of any dead animal they may light on. Others live on saccharine matter, being very fond of the sweet substance, called honey-dew, which exudes from the bodies of Aphides, or plant-lice. These they sometimes keep in their nests, and sometimes tend on the plants where they feed; sometimes they even superintend their breeding. By stroking the aphides with their antennæ they cause them to emit the sweet fluid, which the ants then greedily sip up. Various other insects are looked after by ants in a similar manner, or are found in

terous insects otherwise called Termites. See *Termites*.

Antacid (ant-as'id), an alkali, or any remedy for acidity in the stomach. Dyspepsia and diarrhœa are the diseases in which antacids are chiefly employed. The principal antacids in use are magnesia, lime, and their carbonates, and the bicarbonates of potash and soda.

Antæus (an-tē'us), the giant son of Poseidon (Neptune) and Gê (the Earth), who was invincible so long as he was in contact with the earth. Heracles (Hercules) grasped him in his arms and stifled him suspended in the air.

Antakieh, Antakia. See *Antioch*.

Antalkali (ant-al'ka-li), a substance which neutralizes an alkali, and is used medicinally to counteract an alkaline tendency in the system. All true acids have this power.

Antananarivo (an-tan-an-a-ré'vô), the capital of Madagascar, situated in the central province of Imérina; of late years almost entirely rebuilt, its old timber houses having been replaced by buildings of sun-dried brick on European models. It contains two royal palaces, immense timber structures, one of which has been lately surrounded with a massive stone verandah with lofty corner towers. It has manufactures of metal work, cutlery, silk, etc., and exports sugar, soap, and oil. Pop. (1907) 69,000.

Antar (an'tar), an Arabian warrior and poet of the sixth century, author of one of the seven Moallakas hung up in the Kaaba at Mecca; hero of a romance analogous in Arabic literature to the Arthurian legend of the English. The romance of Antar, which has been called the *Iliad of the Desert*, is composed in rhythmic prose interspersed with fragments of verse, many of which are attributed to Antar himself, and has been generally ascribed to Asmai (b. 740 A.D.; d. about 830 A.D.), preceptor to Harun-al-Rashid.

Antarctic (ant-ärk'tik), relating to the southern pole or to the region near it. The *Antarctic Circle* is a circle parallel to the equator and distant from the south pole 23° 28', marking the area within which the sun does not set when on the tropic of Capricorn. The Antarctic Circle has been arbitrarily fixed on as the limits of the Antarctic Ocean, it being the average limit of the pack-ice; but the name is often extended to embrace a much wider area. The lands within the Antarctic region have of late years become far better known than formerly, and appear to be largely an elevated region, of continental extent. The chief regions are Victoria Land, King Edward VII Land and Ross Island, with the West Antarctic peninsula. Most of the expeditions to the South Pole have been by way of the Ross Sea opening into the Pacific, about 1500 miles from New Zealand.

There is no animal life apart from that in the sea and along the shore. Among the birds the most notable are the penguins, which have almost human characteristics. There are several varieties of seal, whales and dolphins. See articles on *Amundsen*, *Scott*, *Shackleton* and *South Polar Exploration*.

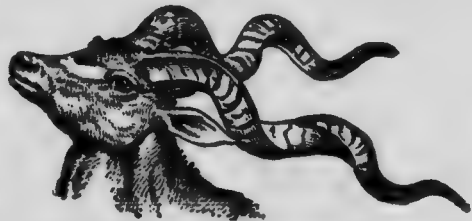
Ant-eater, a name given to mammals of various genera that prey chiefly on ants, but usually confined to the genus *Myrmecophaga*, order Edentata. In this genus the head is remarkably elongated, the jaws destitute of teeth, and the mouth furnished with a long, extensible tongue covered with glutinous

saliva, by the aid of which the animals secure their insect prey. The eyes are very small, the ears short and round, and the legs, especially the anterior, very robust, and furnished with long, compressed, acute nails, admirably adapted for breaking into the ant-hills. The most remarkable species is the *Myrmecophaga jubata* or ant-bear, a native of the warmer parts of South America. It is from 4 to 5 feet in length from the tip of the muzzle to the origin of the black bushy tail, which is about two feet long. The body is covered with long hair, particularly along the neck and back. It is a harmless and solitary animal, and spends most of its time in sleep. Some species are adapted for climbing trees in quest of the insects on which they feed, having prehensile tails. All are natives of South America. The name ant-eater is also given to the pangolins and to the aardvark of Africa. The echidna of Australia is sometimes called *porcupine ant-eater*.

Antecedent (an-tē-sē'dent), in grammar, the noun to which a relative or other pronoun refers; as, Solomon was the *prince* who built the temple, where the word *prince* is the antecedent of *who*.—In logic, that member of a hypothetical or conditional proposition which contains the condition, and which is introduced by *if* or some equivalent word or words; as, if the sun is fixed, the earth must move. Here the first and conditional proposition is the *antecedent*, the second the *consequent*.

Antediluvian (an-tē-di-lū'vi-an), before the flood or deluge of Noah's time; relating to what happened before the deluge. In geology the term has been applied to organisms, traces of which are found in a fossil state in formations preceding the Diluvial, particularly to extinct animals such as the palæotherium, the mastodon, etc.

Antelope (an'te-lōp), the name given to the members of a large family of Ruminant Ungulata or Hoofed



Antelope—Koodoo (*Strepsiceros koodoo*).

Mammalia, closely resembling the Deer in general appearance, but essentially different in nature from the latter animals.

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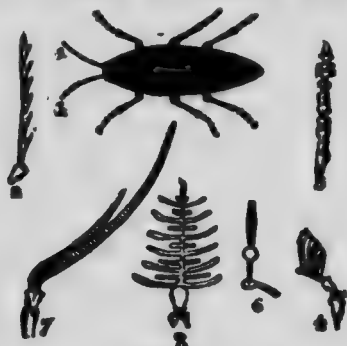
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They are included with the sheep and oxen in the family of the Cavicornia or 'hollow-horned' ruminants. Their horns, unlike those of the deer, are not deciduous, but are permanent; are never branched, but are often twisted spirally, and may be borne by both sexes. They are very numerous and with great variety of species in Africa. Well-known species are the gazelle, the addax, the eland, the koodoo, the gnu, the springbok, the chamois of the Alps, the sasin or Indian antelope, and the pronghorn of America.

Antennae (an-ten'è), the name given to the movable jointed organs of touch and hearing attached to



Antennae.

1, 1, Filiform Antennae of Cucujo Firefly of Brazil (*Pyrophorus luminosus*). 2, Denticulate Antenna; 3, Bipinnate; 4, Lamellicorn; 5, Clavate; 6, Geniculate; 7, Antenna and Antennule of Crustacean.

the heads of insects, myriapods, etc., and commonly called horns or feelers. They present a very great variety of forms.

Antequera (an-te-kà'ra), a city of Andalusia, in Spain, in the province of Malaga, a place of some importance under the Romans, with a ruined Moorish castle. Manufactures of woollens, leather, soap, etc. Pop. 31,610.

Anteros (ant'e-ros), in Greek mythology, the god of mutual love. According to some, however, Anteros is the enemy of love, or the god of antipathy; he was also said to punish those who did not return the love of others.

Anthelion (an-thè'li-un), pl. **ANTHELIA**, a luminous ring, or rings, seen by an observer, especially in alpine and polar regions, around the shadow of his head projected on a cloud or fog-bank, or on grass covered with dew, 50 or 60 yards distant, and opposite the sun when rising or setting. It is due to the diffraction of light.

Anthelminthics, **Anthelmin-
tics** (an-thel-min'tiks), a class of remedies used to destroy worms

when lodged in the alimentary canal; classed as vermicides or vermifuges, according as the object is to kill the worms or to expel them by purgation.

Anthem (an'them), originally a hymn sung in alternate parts; in modern usage, a sacred tune or piece of music set to words taken from the Psalms or other parts of the Scriptures, first introduced into church service in Elizabeth's reign; a developed motet. The anthem may be for one, two, or any number of voices, but seldom exceeds five parts, and may or may not have an organ accompaniment written for it.

Anthemion (an-thè'mi-un), an ornament or ornamented series used in Greek Roman decoration, which is derived from floral forms, more



Anthemion.

especially the honeysuckle. It was much used for the ornamentation of friezes and interiors, for the decoration of fictile vases, the borders of dresses, etc.

Anthemis (an'the-mis), a genus of composite plants, comprising the camomile or chamomile.

Anthemius (an-thè'mi-us), a Greek mathematician and architect of Lydia; designed the Church of St. Sophia at Constantinople; wrote a learned treatise on burning-glasses, and established the use of the directrix.

Anther, the male organ of the flower; that part of the stamen which is filled with pollen.

Anthesteria (an-thes-te'-ri-a), an annual Greek festival held in honor of all the gods, more particularly of Bacchus or Dionysus, and to celebrate the beginning of spring, and the season when the wine of the previous vintage was considered fit for use.

Anthocyanin (an-tho-si'a-nin), the blue color of flowers, a pigment obtained from those petals of flowers which are blue by digesting them in spirits of wine.

Anthology (an-thol'o-gi; Gr. *anthos*, a flower, and *legein*, to gather), the name given to any collection of extracts from various authors,



a, Ovules.
bb, Anthers.
c, Stigma.

but especially to the Greek. The first who compiled a Greek anthology was Meleager, a Syrian, about 60 B.C. He entitled his collection, which contained selections from forty-six poets besides many pieces of his own, the *Garland*; a continuation of this work by Philip of Thessalonica in the age of Tiberius was the first entitled *Anthology*. Later collections are that of Constantine Cephalas, in the tenth century, who made much use of the earlier ones, and that of Maximus Planudes, in the fourteenth century, a monk of Constantinople, whose anthology is a tasteless series of extracts from the Anthology of Cephalas, with some additions. The treasures contained in both, increased with fragments of older poets, idyls of the bucolic poets, the hymns of Callimachus, epigrams from monuments and other works, have been published in modern times as the *Greek Anthology*.

Anthron, CHARLES, an American editor of classical school-books, and of works intended to facilitate the study of Greek and Latin literature; born at New York city in 1797, died in 1867. He was long a professor in Columbia College, New York.

An'thony, HENRY B., statesman, born at Coventry, Rhode Island, in 1815; died Sept. 2, 1884. He graduated at Brown University in 1833; edited the *Providence Journal* 1838-59; was governor of Rhode Island 1849-51, and U. S. Senator after 1859. In 1869 and again in 1871 he served as president *pro tempore* of the Senate.

An'thony, SUSAN B., born at Adams, Massachusetts, in 1820; died in 1906. She was an early and eloquent leader in antislavery and woman's rights movement, and also an advocate of total abstinence.

Anthony, ST., the founder of monastic institutions; he was born in Upper Egypt, about A.D. 251. Giving up all his property he retired to the desert, where he was followed by a number of disciples, who thus formed the first community of monks. He died at the age of 105.—*St. Anthony's Fire*, a name given to erysipelas.

Anthracene (an'thra-sen), a hydrocarbon obtained from coal-tar being extracted from the last portion of the distillate by pressure. It forms small, colorless plates, which melt at about 415° F. to a colorless liquid, and distills at over 572°. It is insoluble in water, but easily so in hot alcohol, ether and benzol. Its chemical composition is $C_{14}H_{10}$, and it is of much commercial importance since it is the start-

ing-point in the manufacture of artificial alizarin (*q. v.*).

Anthracite (an'thra-sit), hard or stone coal, a non-bituminous coal of a shining luster, approaching to metallic, which burns without smoke, with a weak or no flame, and with intense heat. It consists of, on an average, 90 per cent. carbon, 3 hydrogen, and 5 ash, surpassing bituminous coal in hardness and heat-giving properties. It has some of the properties of coke or charcoal, and, like that substance, represents an extreme metamorphism of coal under the influence of heat of volcanic disturbance. It is found in large deposits in Pennsylvania and occurs rather sparingly elsewhere, but may prove to be abundant in China.

Anthrax (an'thraks), a fatal disease to which cattle, horses, sheep, and other animals are subject, always associated with the presence of an extremely minute micro-organism (*Bacillus anthracis*) in the blood. It frequently assumes an epizootic form, and extends over large districts, affecting all classes of animals which are exposed to the exciting causes. It is also called splenic fever, and is communicable to man, appearing as carbuncle, malignant pustule, or wool-sorter's disease.

Anthropolatry (an-thrō-po-l'a-tri), the worship of man, a word always employed in reproach; applied by the Apollinarians, who denied Christ's perfect humanity, towards the orthodox Christians.

Anthropology (an-thrō-pol'o-jī), the science of man and mankind, including the study of man's place in nature, that is, of the measure of his agreement with and divergence from other animals; of his physical structure and psychological nature, together with the extent to which these act and react on each other; and of the various tribes of men, determining how these may have been produced or modified by external conditions, and consequently taking account also of the advance or retrogression of the human race. It puts under contribution all sciences which have man for their object, as archæology, comparative anatomy, physiology, psychology, climatology, etc. See *Ethnology*.

Anthropometry (an-thrō-pom'e-tri), the systematic examination of the height, weight, and other physical characteristics of the human body. It was shown in the British Association Report of 1883 that variations in stature, weight, and complexion, existing in different districts of the British Islands.

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Anthropomorphism

are chiefly due to difference of racial origin. The average height of the adult males of the principal races or nationalities of the world may be given as follows, but it is acknowledged that more numerous measurements might alter some of the figures considerably:—Polynesians 69.33 in., Patagonians 69 in., negroes of the Congo 69 in., Scotch 68.71 in., Iroquois Indians 68.28 in., Irish 67.90 in., Americans (whites) 67.67 in., English 67.66 in., Norwegians 67.66 in., Zulus 67.19 in., Welsh 66.66 in., Danes 66.65 in., Dutch 66.62 in., American negroes 66.62 in., Hungarians 66.58 in., Germans 66.54 in., Swiss 66.43 in., Belgians 66.38 in., French 66.23 in., Berbers 66.10 in., Arabs 66.08 in., Russians 66.04 in., Italians 66 in., Spaniards 65.66 in., Esquimaux 65.10 in., Papuans 64.78 in., Hindus 64.76 in., Chinese 64.17 in., Poles 63.87 in., Finns 63.60 in., Japanese 63.11 in., Peruvians 63 in., Malays 62.34 in., Lapps 59.02 in., Bushmen 52.78 in. Average 65.25 in.

Anthropomorphism (an-thrō-pō-mor'fizm), the representation or conception of the Deity under a human form, or with human attributes and affections. *Anthropomorphism* is founded in the natural inaptitude of the human mind for conceiving spiritual things except through sensuous images.

Anthropophagi (an-thrō-pof'a-ji), the name given to those individuals or tribes by whom human flesh is eaten: man-eaters, cannibals. That there are nations who eat the flesh of enemies slain in battle, for example the Niam-Niam of Central Africa, and till recently the New Zealanders, is well known; but there are none who make human flesh their usual food. The Caribs are said to have been cannibals at the time of the Spanish conquest of America, and the word 'cannibal' is derived from their name.

Anti-aircraft Guns, an important branch of modern artillery. For defense against aircraft various types of guns were in use, in the Great war. Some were of the mobile type, mounted on motor vehicles; some were of the fixed type, mounted upon permanent emplacements; still others were of the field-piece type, which, while fired from a stationary position, might be moved from point to point upon a suitable carriage. The heaviest of the anti-aircraft motor-driven gun was the 10.5 centimeter (4¼-inch) quick firer, throwing a shell weighing nearly forty pounds with an initial velocity of 2333 feet per second. This gun was used extensively by the Germans in the war. A smaller 'Archibald' or 'Archie'—as the British

troops termed these pieces—was the 3-inch gun throwing a 14.3 shell at an initial velocity of about 2170 feet per second. The Allied forces improvised traveling anti-aircraft defenses by mounting the latest types of Vickers, Hotchkiss and other machine guns in armored motor cars. Some of these guns maintained a hot fire ranging up to 750 shots per minute. The fixed anti-aircraft guns such as were stationed upon eminences and buildings and used by the British to combat the German air raiders were of the quick-firing type, the object being to hurl a steady stream of missiles upon the swiftly moving aeroplane. Machine guns were also used for this purpose, their range of approximately 2000 yards and rapidity of fire being of distinct value when hostile aircraft descended to an altitude which brought them within range of the weapon.

Antibes (an-tēb), a fortified town and seaport of France, dep. Alpes-Maritimes, on the Mediterranean, 11 miles s. s. w. of Nice; founded about 340 B. C. Traces of a Roman circus and part of an aqueduct still remain; and urns, lamps, etc., have been found. Pop. 5730.

Antichlor (an'ti-klor), the name given to any chemical substance, such as hyposulphite of sodium, employed to remove the small quantity of chlorine which obstinately adheres to the fibers of the cloth when goods are bleached by means of chlorine.

Antichrist (an'ti-krist), a word occurring in the first and second epistles of St. John, and nowhere else in Scripture, in passages having an evident reference to a personage real or symbolical mentioned or alluded to in various other passages both of the Old and New Testaments. In every age the church has held through all its sects some definite expectation of a formidable adversary of truth and righteousness prefigured under this name.

Anticlimax (an-ti-klī'maks), a sudden declension of a writer or speaker from lofty to mean thoughts or language, as in the well-known lines:

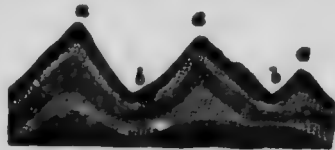
Next comes Dalhousie, the great god of war;
Lieutenant-colonel to the Earl of Mar.

Anticlinal (an-ti-klī'nal), **LINE OR AXIS**, in geology, the ridge of a wave-like curve made by a series of superimposed strata, the strata dipping from it on either side as from the ridge of a house; a *synclinal line* runs along the trough of such a wave. Anticlines may be small curves in a hand specimen or large mountains.

Anticosti (an-ti-kos'ti), an island of Canada, in the mouth of

Anticyclone

the St. Lawrence, 125 miles long by 80 miles broad. The interior is mountainous and wooded, but there is much good land, and it is well adapted for agriculture. The fisheries are valuable. The population is scanty, however.



aaa, Anticlinical Line. bb, Synclinal Line.

Anticyclone (an-ti-sī'klōn), a phenomenon presenting some features opposite to those of a cyclone. It consists of a region of high barometric pressure, the pressure being greatest in the center with winds flowing outwards from the center, and not inwards as in the cyclone, accompanied with great cold in winter and with great heat in summer.

Antioyra (an-tis'i-ra), the name of two towns of Greece, the one in Thessaly, the other in Phocis, famous for hellebore, which in ancient times was regarded as a specific against insanity and melancholy. Hence various jocular allusions in ancient writings.

Antidote (an'ti-dōt), a medicine to counteract the effects of a poison.

Antietam (an-'tē-tam), a small stream in the United States which falls into the Potomac about 50 miles N. W. of Washington; scene of a battle between the Federal and Confederate armies, led by McClellan and Lee, on Sept. 17, 1862.

Antifebrin (an-ti-fe'brin), or ACETANILID, a febrifuge and antineuralgic derived from aniline, to which it is closely allied. It was introduced in 1886, and its cheapness, rapidity of action, and reliability brought it quickly into use. It is a white powder, with burning taste; soluble in alcohol.

Antifricition (an-ti-frik'shun) METAL, a name given to various alloys of tin, zinc, copper, antimony, lead, etc., which oppose little resistance to motion, with great resistance to the effects of friction, so far as concerns the wearing away of the surfaces of contact. Babbitt's metal is composed of tin, antimony, and copper.

Antigo (an'ti-gō), a city of Wisconsin, county seat of Langlade Co., 196 miles N. N. W. of Milwaukee; with potato and dairy interests, with railroad shops and manufactures. Pop. 8000.

Antimony

Antigone (an-tig'o-nē), in Greek mythology, the daughter of Oedipus and Jocasta, celebrated for her devotion to her father and to her brother Polyneices, for burying whom against the decree of King Creon she suffered death. She is heroine of Sophocles' *Oedipus at Colonus* and his *Antigone*.

Antigonus (an-tig'o-nus), one of the generals of Alexander the Great, born about 382 B.C. After the death of Alexander, Antigonus obtained Greater Phrygia, Lycia, and Pamphylia as his dominion. Ptolemy, Cassander, and Lysimachus, alarmed by his ambition, united themselves against him; and a long series of contests ensued in Syria, Phœnicia, Asia Minor, and Greece, ending in 301 B.C. with the battle of Ipsus in Phrygia, in which Antigonus was defeated and slain. —ANTIGONUS GON'ATAS, son of Demetrius Poliorcetes, and grandson of the above, succeeded his father in the Kingdom of Macedon and all his other European dominions; died after a reign of forty-four years B.C. 239.

Antigua (an-tē'ga), one of the British West Indies, the most important of the Leeward group; 28 miles long, 20 broad; area, 108 square miles. Discovered by Columbus, 1493. Its shores are high and rocky; the surface is varied and fertile. The capital, St. John, the residence of the governor of the Leeward Islands, stands on the shore of a well-heltered harbor in the northwest part of the island. The staple articles of export are sugar, molasses, rum. Pop. (including Barbuda), 34,971, of which 28,000 are negroes.

Antilles (an-ti'ēs, an-tēl), another name for the West Indian Islands.

Antimachus (an-tim'a-kus), a Greek poet who lived about 400 B.C., and wrote an epic called the *Thebais*, and a long elegy called *Lyde*, inspired by a mistress of that name; only fragments of his writings remain.

Anti-Masonic Party, an American organization which opposed the alleged influence of freemasonry in civil affairs. It sprang up in western New York, following the kidnapping of William Morgan in 1826, who, it was said, had threatened to disclose the secrets of the order. It held a national convention in 1831, but was absorbed by the Whigs. Anti-Masonic agitation prevailed for some time in local political affairs. Its revival under the name of the American Party was attempted in 1875, but the project gained only a small following.

Antimony (an'ti-mo-ni; chemical sym. Sb, from L. *stibium*;

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sp. gr. 6.8, atomic wt. 120), a brittle metal of a bluish-white or silver-white color and a crystalline or laminated structure. It melts at 842° F., and burns with a bluish-white flame. The mineral called stibnite or antimony-glance, is a trisulphide (Sb_2S_3), and is the chief ore from which the metal is obtained. It is found in many places, including France, Spain, Hungary, Italy, Canada, Australia, and Borneo. The metal, or, as it was formerly called, the *regulus of antimony*, does not rust or tarnish when exposed to the air. When alloyed with other metals it hardens them, and is therefore used in the manufacture of alloys, such as Britannia-metal, type-metal, and pewter. In bells it renders the sound more clear; it renders tin more white and sonorous as well as harder, and gives to printing types more firm-

trines and practices which seem to condemn or discountenance strict moral obligations. The Lutherans and Calvinists have both been charged with antinomianism, the former on account of their doctrine of justification by faith, the latter both on this ground and that of the doctrine of predestination. The charge is, of course, vigorously repelled by both.

Antinomy (an-ti-nō'my), the opposition of one law or rule to another law or rule; in the Kantian philosophy, that natural contradiction which results from the law of reason, when, passing the limits of experience, we seek to conceive the complex of external phenomena, or nature, as a world or cosmos.

Antinous (an-tin'o-us), a young Bithynian whom the extravagant love of Hadrian has immortal-

ized. He drowned himself in the Nile in 122 A.D., to save Hadrian from an impending catastrophe, predicted by an oracle unless averted by the self-sacrifice of the emperor's most beloved friend. Hadrian set no bounds to his grief for his loss. He gave his name to a newly-discovered star, erected temples in his

honor, called a city after him, and caused him to be adored as a god throughout the empire. Statues, busts, etc., of him are numerous.

Antioch (an'ti-ok; anciently, *Antiochia*), a famous city of ancient times, the capital of the Greek kings of Syria, on the left bank of the Orontes, about 21 miles from the sea, in a beautiful and fertile plain; founded by Seleucus Nicator in 300 B.C., and named after his father Antiochus. In Roman times it was the seat of the Syrian governors, and the center of a widely extended commerce. It was called the 'Queen of the East' and 'The Beautiful.' Antioch is frequently mentioned in the New Testament, and it was here that the disciples of our Saviour were first



St. John, Antigua, from the foreground of the Scotch Church.

ness and smoothness. The salts of antimony are very poisonous. Tartar emetic is the tartrate of antimony and potassium and has long been justly regarded as a most valuable remedy in many diseases.—*Yellow antimony* is a preparation of antimony of a deep yellow color, used in enamel and porcelain painting. It is of various tints, and the brilliancy of the brighter hues is not affected by foul air.

Antinomianism (an-ti-nō'mi-an-izm, 'opposition to the law'), the name given by Luther to the inference drawn by John Agricola from the doctrine of justification by faith, that the moral law is not binding on Christians as a rule of life. The term antinomian has since been applied to all doc-

called Christians (Acts, xi, 26). In the first half of the seventh century it was taken by the Saracens, and in 1098 by the Crusaders. They established the principality of Antioch, of which the first ruler was Bohemond, and which lasted till 1268, when it was taken by the Mameluke Sultan of Egypt. In 1516 it passed into the hands of the Turks. The modern Antioch, or *Antakieh*, occupies but a small portion of the site of the ancient Antioch. Pop. about 28,000. Its ancient population was estimated at 400,000. There was another Antioch, in Pisidia, at which Paul preached on his first missionary journey.

Antiochus (an-ti'o-kus), a name of several Græco-Syrian kings of the dynasty of the Seleucide.

ANTIOCHUS I, called Sôtêr ('saviour'), was son of Seleucus, general of Alexander the Great, and founder of the dynasty. He was born about B.C. 324, and succeeded his father in B.C. 280. During the greater part of his reign he was engaged in a protracted struggle with the Gauls, who had crossed from Europe, and by whom he was killed in battle B.C. 261.—**ANTIOCHUS II**, surnamed Theos (god), succeeded his father, lost several provinces by revolt, and was murdered in B.C. 246 by Laodicê, his wife, whom he had put away to marry Berenice, daughter of Ptolemy.—**ANTIOCHUS**

III, surnamed the *Great*, grandson of the preceding, was born B.C. 242, succeeded in B.C. 223. The early part of his reign embraced a series of wars against revolted provinces and neighboring kingdoms, his expeditions extending to India, over Asia Minor, and later into Europe, where he took possession of the Thracian Chersonese. Here he encountered the Romans, who had conquered Philip V of Macedon, and were prepared to resist his further progress. Antiochus gained an important adviser in Hannibal, who had fled for refuge to his court; but he lost the opportunity of an invasion of Italy while the Romans were engaged in war with the Gauls, of which the Carthaginian urged him to avail himself. The Romans defeated him by sea and land, and he was finally overthrown by Scipio at Mount Sipylus in Asia Minor, B.C. 190, and very severe terms were imposed upon him. He was killed while plundering a temple in Elymais to procure money to pay the Romans.—**ANTIOCHUS IV**, called *Epiphanes*, youngest son of the above, is

chiefly remarkable for his attempt to extirpate the Jewish religion, and to establish in its place the polytheism of the Greeks.

Antioquia (an-ti-ô-kê'a), a town of South America, in Colombia, on the river Cauca; founded in 1542. Pop. 9000. It gives name to a department of the republic; area, 22,870 sq. miles; pop. about 500,000. It has rich ores of the precious metals and dense forests. Capital, Medellin.

Antiparos (an-tip'a-ros; ancient Oliaros), one of the Cyclades Islands in the Grecian Archipelago, containing a famous stalactitic grotto or cave. It lies southwest of Paros, from which it is separated by a narrow strait, and has an area of 10 squares miles, and about 700 inhabitants.

Antipater (an-tip'a-têr), a general and friend of Philip of Macedon, father of Alexander the Great. On the death of Alexander, in 323 B.C.,



Medal of Antiochus Epiphanes.



the regency of Macedonia was assigned to Antipater, who succeeded in establishing the Macedonian rule in Greece on a firm footing. He died in B.C. 319 at an advanced age.

Antiphlogistic (an-ti-flô-jis-tik), a term applied to medicines or methods of treatment that are intended to counteract inflammation.

Antiphlogistine (flô-jis'tin), the trade name for cataplasma kaolin, a clay-like substance, grey in color, containing boric acid, methyl-salicylate, thymol, glycerine and wintergreen, used for the reduction of inflammation in cases of rheumatism, pneumonia, etc.

Antiphon (an'ti-fon), a Greek orator, born near Athens; founder of political oratory in Greece. His orations are the oldest extant, and he is said to have been the first who wrote speeches for hire. He was put to death for taking part in the revolution of B.C. 411, which established the oligarchic government of the Four Hundred.

Antiphon Antiphony

Antiseptic

Antiphon, Antiphony (an-tif'o-ni; ^{alternat} song'), in the Christian church a verse first sung by a single voice, and then repeated by the whole choir; or any piece to be sung by alternate voices.

Antipodes (an-tip'o-déz), the name given relatively to people or places on opposite sides of the earth, so situated that a line drawn from one to the other passes through the center of the earth and forms a true diameter. The longitudes of two such places differ by 180°. The difference in their time is about twelve hours, and their seasons are reversed.

Antipodes Islands, a group of small uninhabited islands in the South Pacific Ocean, about 460 miles S. E. by E. of New Zealand; so called from being nearly antipodal to Greenwich. Antipodes Island rises to 1,300 feet, and is largely covered with coarse grass; huts have recently been fitted up to shelter castaways.

Antipope (an-ti-pōp), the name applied to those who at different periods have produced a schism in the Roman Catholic Church by opposing the authority of the pope, under the pretense that they were themselves popes. They have in nearly all cases been the creatures of some political power at odds with the reigning pontiff over the relations between temporal and spiritual affairs. They were most frequent in the tenth, eleventh and twelfth centuries, first on account of the factional strifes among the Roman nobility, and then of the great struggle about investitures between the popes and the German emperors. The longest crisis of this kind was that known as the Great Schism (1378-1417). Felix V (abd. 1449) was the last antipope.

Antipyrin (an-ti-pf'rin), a useful substitute for quinine, obtained from coal-tar by a complex chemical process. It is a white, tasteless powder, which reduces the temperature in fevers without the discomfort of profuse perspiration, which gives it great value as a febrifuge.

Antiquaries (an-ti-qua-rēs), those devoted to the study of ancient times through their relics, as old places of sepulture, remains of ancient habitations, early monuments, implements or weapons, statues, coins, medals, paintings, inscriptions, books, and manuscripts, with the view of arriving at a knowledge of the relations, modes of living, habits, and general condition of the people who created or employed them. Societies or associations of anti-

quaries have been formed in all countries of European and American civilization.

Anti-Rent War, a struggle which resulted from the dissatisfaction of tenants under the patroon system in some of the counties of New York state. The feud lasted for several years from 1839, when Stephen Van Rensselaer, one of the largest land-owners died, to 1846, when the legislature abolished all feudal tenures.

Antirrhinum (an-ti-ri'num). See *Snagdragon*.

Anti-Saloon League, an American society for the suppression of the liquor traffic, first founded in Ohio as a state body in 1893. It is now a national organization, with branch leagues throughout the country. The executive offices are at Westerville, O., and the Legislative Committee at Washington, D. C. The league has been devoted chiefly to influencing legislation in favor of prohibition, and a long series of successes must be credited to the work of this society, including the Federal prohibition amendment. See *Prohibition*.

Antiseptic (an-ti-sep'tik; Gr. *anti*, against, and *sepein*, to rot), an agent by which the putrefaction of vegetable or animal matters is prevented or arrested or which prevents the growth of septic bacteria. There are a great number of substances having this preservative property, among which are salt, alcohol, vegetable charcoal, creosote, corrosive sublimate, tannic acid, sulphurous acid, sulphuric ether, chloroform, arsenic, wood-spirit, aloes, camphor, benzine, aniline, etc. The packing of fish in ice, and the curing of herring and other fish with salt, are familiar antiseptic processes. The different antiseptics act in different ways. The term is applied in a specific manner to that mode of treatment in surgery by which bacteria in the air are excluded from wounds on whose presence suppuration is known to depend. Also applies to the antiseptic cleansing of injuries or to skin surfaces before operation to remove bacteria presumed to be present.

The discovery of the ideal antiseptic was announced on August 5, 1915, by Dr. Alexis Carrel, of the Rockefeller Institute, and Dr. Henry D. Dakin, of the Lister Institute. It is made by adding carbonate of lime and boric acid to hypochlorite of lime. Remarkable results have been attained by its use, and if applied in time, it is asserted, infection in wounds is impossible. Independent research on the part of Prof. Lorrelin Smith, produced similar results. See *Lister*.

Anti-Slavery, a party in the United States before the civil war, in opposition to the slavery system. See *Abolitionists*.

Antispasmodic (an-ti-spaz-mod'ik), a medicine proper for the cure or prevention of spasms and convulsions. Such belongs, to some extent, to the class of ether, chloroform, amyl, nitrite, etc.; others are narcotics, as morphine, hyoscine, etc.

Antisthenes (an-tis'then-ēz), a Greek philosopher and founder of the school of Cynics, born at Athens before B.C. 400. He was a disciple of Socrates.

Antistrophe (an-tis'trō-fē). See *Strophe*.

Antitaurus (an-ti-taw'rus). See *Taurus*.

Antithesis (an-tith'e-sis; opposition), figure of speech consisting in a contrast or opposition of words or sentiments; as, 'When our vices leave us, we flatter ourselves we leave them'; 'The prodigal robs his heir, the miser robs himself.'

Antitoxin (an-ti-toks'in), specifically the antibody to a toxin of bacterial or related origin which is produced as the result of immunization with the corresponding toxin. Examples are the diphtheria antitoxin and the tetanus antitoxin. Streptococcus antitoxin is an antitoxin obtained by repeated inoculations of horses with streptococcus cultures; employed by hypodermic injection in the treatment of erysipelas, puerperal fever, septicemia and other conditions in which there is infection by streptococci. The value of antitoxin in diphtheria is now so fully established that its administration is a routine procedure in cases of this disease, and there are various other uses to which it is successfully applied. Its use in medical practice is of modern date.

Anti-trade, a name given to any of the upper tropical winds which move northward or southward in the same manner as the trade-winds which blow beneath them in the opposite direction. These great aerial currents descend to the surface after they have passed the limits of the trade-winds, and form the southwest or west-southwest winds of the north temperate, and the northwest or west-northwest winds of the south temperate zones.

Antitrinitarians (an-ti-trin-i-tā'ri-anz), all who do not accept the doctrine of the divine Trinity, or the existence of three persons in the Godhead; especially applied to those who oppose such a doctrine on philosophical grounds, as contrasted with

Unitarians, who reject the doctrine as not warranted by Scripture.

Antitype (an'ti-tip), that which is correlative to a type; by theological writers the term is employed to denote the reality of which a type is the prophetic symbol.

Antium (an'ti-um), in ancient Italy, one of the most ancient and powerful cities of Latium, the chief city of the Volsci, and often at war with the Romans, by whom it was finally taken in 338 B.C. It was 38 miles distant from Rome, a flourishing seaport, and became a favorite residence of the wealthy Romans. It was destroyed by the Saracens; but vestiges of it remain at Porto d'Anzio, near which many valuable works of art have been found.

Antivari (an-tē'vā-rē), a seaport town on the eastern shore of the Adriatic, ceded to Montenegro by the Treaty of Berlin (1878). Pop. about 2500.

Antlers (ant'lerz), the horns of the deer tribe, or the snags or branches of the horns. See *Deer*.

Ant-lion, the larva of a Neuropterous insect (*Myrmelæon formicarius*), which in its perfect state greatly resembles a dragon-fly; curious on account of its ingenious method of catching the insects—chiefly ants—on which it feeds. It digs a funnel-shaped hole in the driest and finest sand it can find, and when



Perfect Insect (*Myrmelæon formicarius*) and Larva (ant-lion).

the pit is deep enough, and the sides are quite smooth and sloping, it buries itself at the bottom with only its formidable mandibles projecting, and waits till some luckless insect stumbles over the edge, when it is immediately seized, its juices sucked, and the dead body jerked from the hole.

Antofagasta (an-to-fā-gās'tā), a Chilean seaport on the Bay of Morena, and a territory of the same name taken from Bolivia in 1882. The territory has an area of 60,968 sq. miles, and a population of 44,085. The port is connected by railway with the silver mines of Caracoles, and exports silver, copper, cubic niter, etc. Pop. 19,482.

Antoinette (an-twā-net), MARIE (Marie Antoinette Jo

Antoinette

Antoinette (Antoinette Jeanne de Lorraine), Archduchess of Austria and Queen of France, the youngest daughter of the Emperor Francis I and of Maria Theresa, was born at Vienna, 2d November, 1755; executed at Paris, 16th Oct., 1793. She was married at the age of fifteen to the dauphin, afterwards Louis XVI, but her manners were ill suited to the French court, and she made many enemies among the highest families by her contempt for its ceremonies, which excited her ridicule. The freedom of her manners, indeed, even after she became queen, was a cause of scandal. The extraordinary affair of the diamond necklace, in which the Cardinal Louis de Rohan, the great quack Cagliostro, and a certain Countess de La Motte were the chief actors, tarnished her name and added force to the calumnies against her. Though it was proved in the examination which she demanded that she had never ordered the necklace, her enemies succeeded in casting a stigma on her, and the credulous people laid every public disaster to her charge. There is no doubt she had great influence over the king, and that she constantly opposed all measures of reform. The enthusiastic reception given her at the guards' ball at Versailles on 1st October, 1789, raised the general indignation to the highest pitch, and was followed in a few days by the insurrection of women, and the attack on Versailles. When virtually prisoners in the Tuilleries it was she who advised the flight of the royal family in June, 1791, which ended in their capture and return. On 10th August, 1792, she heard her husband's deposition pronounced by the Legislative Assembly, and accompanied him to the prison in the Temple, where she displayed the magnanimity of a heroine and the patient endurance of a martyr. In January, 1793, she parted with her husband, who had been condemned by the Convention; in August she was removed to the Conciergerie; and in October she was charged before the revolutionary tribunal with having dissipated the finances, exhausted the treasury, corresponded with the foreign enemies of France, and favored the domestic foes of the country. She defended herself with firmness, decision, and indignation; and heard the sentence of death pronounced with perfect calmness—a calmness which did not forsake her when the sentence was carried out the following morning. Her son, eight years of age, died shortly afterwards, and her daughter was suffered to quit France, and afterwards married her cousin, the Duke of Angoulême.

Antoninus

Antommarchi (an-tom-mär'kē), CARLO FRANCESCO, an Italian physician, born in Corsica in 1780, died in Cuba in 1838. He was professor of anatomy at Florence when he offered himself as physician of Napoleon at St. Helena. Napoleon at first received him with reserve, but soon admitted him to his confidence, and testified his satisfaction with him by leaving him a legacy of 100,000 francs. On his return to Europe he published the *Derniers Moments de Napoléon* (two vols., 8vo 1823).

Antonelli (än-to-nel'lē), GIACOMO, cardinal, born 1806, died 1876. He was educated at the Grand Seminary of Rome, where he attracted the attention of Pope Gregory XVI, who appointed him to several important offices. On the accession of Pius IX, in 1846, Antonelli was raised to the dignity of cardinal deacon; two years later he became president and minister of foreign affairs, and in 1850 was appointed secretary of state. During the sitting of the Ecumenical Council (1869-70) he was a prominent champion of the papal interest. He strongly opposed the assumption of the united Italian crown by Victor Emanuel.

Antonello (an-to-nel'lō), of Messina, an Italian painter who died about the close of the 15th century, and is said to have introduced oil-painting into Italy (at Venice), having been instructed in it by John van Eyck.

Antoninus (an-to-ni'nus), ITINERARY OF. See *Itinerary*. **ANTONINUS, MARCUS AURELIUS.** See *Aurelius*.

Antoninus, WALL OF, a barrier erected by the Romans in Britain across the isthmus between the Forth and the Clyde, in the reign of Antoninus Pius.

Its western extremity was at or near Dunglass Castle, its eastern at Carriden, and the whole length of it exceeded 36 miles. It was constructed A.D. 140 by Lollius Urbicus, the imperial legate, and consisted of a ditch 40 feet wide and 20 feet deep, and a rampart of stone and earth on the south side 24 feet thick and 20 feet in height. It was strengthened at each end and along its course by a series of forts



Coin of Antoninus Pius.

and watch-towers. It may still be traced at various points, and is commonly known as *Graham's Dyke*.

Antoninus Pius, **TITUS AURELIUS FULVUS**, Roman emperor, was born at Lavinium, near Rome, A.D. 86, died A.D. 161. In A.D. 120 he became consul, and he was one of the four persons of consular rank among whom Hadrian divided the supreme administration of Italy. He then went as proconsul to Asia, and after his return to Rome became more and more the object of Hadrian's confidence. In A.D. 138 he was selected by that emperor as his successor, and the same year he ascended the throne. The persecutions of the Christians he speedily abolished. He carried on but a few wars. In Britain he extended the Roman dominion, and by raising a new wall (see preceding art.) put a stop to the invasions of the Picts and Scots. The senate gave him the surname Pius, that is, dutiful or showing filial affection, because to keep alive the memory of Hadrian he had built a temple in his honor. He was succeeded by Marcus Aurelius, his adopted son.

Antonius (an-tō'ni-us), **MARCUS (MARK ANTONY)**, Roman triumvir, born 83 B.C., was connected with the family of Cæsar by his mother. Debauchery and profligality marked his youth. To escape his creditors he went to Greece in 58, and from thence followed the consul Gabinus on a campaign in Syria as commander of the cavalry. He served in Gaul under Cæsar in 52 and 51. In 50 he returned to Rome to support the interests of Cæsar against the aristocratical party headed by Pompey, and was appointed tribune. When war broke out between Cæsar and Pompey, Antony led reinforcements to Cæsar in Greece, and in the battle of Pharsalia he commanded the left wing. He afterwards returned to Rome with the appointment of master of the horse and governor of Italy (47). In B.C. 44 he became Cæsar's colleague in the consulship. Soon after Cæsar was assassinated, and Antony would have shared the same fate had not Brutus stood up in his behalf. Antony, by the reading of Cæsar's will, and by the oration which he delivered over his body, excited the people to anger and revenge, and the murderers were obliged to flee. After several quarrels and reconciliations with Octavianus, Cæsar's heir (see *Augustus*), Antony departed to Cisalpine Gaul, which province had been conferred upon him against the will of the senate. But Cicero thundered against him in his famous *Philippics*; the senate declared him a

public enemy, and entrusted the conduct of the war against him to Octavianus and the consuls Hirtius and Pansa. After a campaign of varied fortunes Antony fled with his troops over the Alps. Here he was joined by Lepidus, who commanded in Gaul, and through whose mediation Antony and Octavianus were again reconciled. It was agreed that the Roman world should be divided among the three conspirators, who were called triumvirs. Antony was to take Gaul; Lepidus, Spain; and Octavianus, Africa and Sicily. They decided upon the proscription of their mutual enemies, each giving up his friends to the others, the most celebrated of the victims demanded by Antony being Cicero the orator. Antony and Octavianus departed in 42 for Macedonia, where the united forces of their enemies, Brutus and Cassius, formed a powerful army, which was, however, speedily defeated at Philippi. Antony next visited Athens, and thence proceeded to Asia. In Cilicia he ordered Cleopatra, Queen of Egypt, to apologize for her insolent behavior to the triumviri. She appeared in person, and her charms fettered him forever. He followed her to Alexandria, where he bestowed not even a thought upon the affairs of the world, till he was aroused by a report that hostilities had commenced in Italy between his own relatives and Octavianus. A short war followed, which was decided in favor of Octavianus before the arrival of Antony in Italy. A reconciliation was effected, which was sealed by the marriage of Antony with Octavia, the sister of Octavianus. A new division of the Roman dominions was now made (in 40), by which Antony obtained the East, Octavianus the West. After his return to Asia Antony gave himself up entirely to Cleopatra, assuming the style of an eastern despot, thus alienating many of his adherents and embittering public opinion against him at Rome. At length war was declared against the Queen of Egypt, and Antony was deprived of his consulship and government. Each party assembled its forces, and Antony lost, in the naval battle at Actium (B.C. 31), the dominion of the world. He followed Cleopatra to Alexandria, and on the arrival of Octavianus his fleet and cavalry deserted, and his infantry was defeated. Deceived by a false report which Cleopatra had disseminated of her death, he fell upon his own sword (B.C. 30).

Antonomasia (an-tō-nō-mā'zi-a), in rhetoric, the use of the name of some office, dignity, profession, science, or trade instead of the true name

Antony

of the person, as when *his majesty* is used for a king, *his lordship* for a nobleman; or when, instead of Aristotle, we say, *the philosopher*; or, conversely, the use of a proper noun instead of a common noun; as, a *Solomon* for a wise man.

Antony. MARK. See *Antonius, Marcus*.

Antony, St. See *Anthony*.

Antrim (an'trim), a county of Ireland, province of Ulster, in the northeast of the island; area, 1,191 sq. miles, of which about a third is arable. The eastern and northern districts are comparatively mountainous, with tracts of heath and bog, but no part rises to a great height. The principal rivers are the Lagan and the Bann, which separate Antrim from Down and Londonderry, respectively. The general soil of the plains and valleys is strong loam. Flax, oats, and potatoes are the principal agricultural produce. Cattle, sheep, swine, and goats are extensively reared. There are salt-mines and beds of iron-ore, which is worked and exported. A range of basaltic strata stretches along the northern coast, of which the celebrated Giant's Causeway is the most remarkable portion. Linen and cotton-spinning and weaving are the staple manufactures. The principal towns are Belfast, Ballymena, and Larne. Many of the inhabitants are Presbyterians, being the descendants of Scottish immigrants of the seventeenth century. The county sends four members to Parliament. Pop. 461,250. The town of Antrim, at the north end of Lough Neagh, is a small place with a pop. of 2,020.

Ant-thrush, a name given to certain birds having resemblance to the thrushes and supposed to feed largely on ants. They all have longish legs and a short tail. The ant-thrushes of the Old World belong to the genus *Pitta*. They inhabit southern and southeastern Asia and the Eastern Archipelago, and are birds of brilliant plumage. The New World ant-thrushes belong to South America, and live among close foliage and bushes. Some of them are called ant-shrikes and ant-wrens. They belong to several genera.

Antwerp (ant'wêrp; Dutch and Ger. *Antwerpen*, French, *Anvers*), the chief port of Belgium, and the capital of a province of the same name, on the Scheldt, about 50 miles from the open sea. It is strongly fortified, being completely surrounded on the land side

Antwerp

by a semicircular inner line of fortifications, the defenses being completed by an outer line of forts and outworks. The cathedral, with a spire 400 feet high,



Antwerp Cathedral, from the Egg Market.

one of the largest and most beautiful specimens of Gothic architecture in Belgium, contains Rubens's celebrated masterpieces, the *Descent from the Cross*, the *Elevation of the Cross*, and *The Assumption*. The other churches of note are St. James's, St. Andrew's, and St. Paul's, all enriched with paintings by Rubens, Van Dyck, and other masters. Among the other edifices of note are the exchange, the town-hall, the palace, theater, academy of the fine arts, picture and sculpture galleries, etc. The harbor accommodation is extensive and excellent, new docks and quays having been built in recent years. The shipping trade has greatly advanced, and is now very large, the goods being largely in transit. There are numerous and varied industries. Antwerp is mentioned as early as the 7th century, and in the 11th and 12th centuries it had attained a high degree of prosperity. In the early 16th century it is said to have had a pop. of 200,000. The wars between the Netherlands and Spain greatly injured its commerce, which was almost ruined by the closing of the navigation of the

Scheldt in accordance with the peace of Westphalia (1648). It was only in the 19th century that its prosperity revived. Population (1915), 312,884. In the invasion of Belgium by the Germans in 1914 Antwerp, though strongly fortified and defended by a large Belgian army, was unable to withstand the powerful German guns. Siege was laid to it on September 28, and it fell October 10. The city was re-entered by King Albert and Queen Elizabeth November 20, 1918, following the armistice signed by Germany November 11. See *European War*.

Anubis (a-nū'bis; written Inpw in hieroglyphs), one of the deities of the ancient Egyptians, the son of Osiris by Isis. The Egyptian sculptures represent him with the head of a jackal, with long pointed ears. His office was to conduct the souls of the dead from this world to the next, and in the lower world he weighed the souls of the deceased previous to their admission to the presence of Osiris.



Anubis.

Anupshahr (a-nöp'shär), a town of Hindustan, N. W. Provinces, on the Ganges, 75 miles S. E. of Delhi, a resort of Hindu pilgrims who bathe in the Ganges. Pop. about 10,000.

Anus (ä'nus), the opening at the lower or posterior extremity of the alimentary canal through which the excrement or waste products of digestion are expelled.

Anvil (an'vil), an instrument on which pieces of metal are laid for the purpose of being hammered. The common smith's anvil is generally made of seven pieces, namely, the core or body; the four corners for the purpose of enlarging its base; the projecting end, which contains a square hole for the reception of a set or chisel to cut off pieces of iron; and the beak or conical end, used for turning pieces of iron into a circular form, etc. These pieces are each separately welded to the core and hammered so as to form a regular surface with the whole. When the anvil has received its due form, it is faced with steel, and is then tempered in cold water. The smith's anvil is generally placed loose upon a wooden block. The anvil for heavy operations, such as the forging of ordnance and shaft-

ing, consists of a huge iron block deeply embedded, and resting on piles of masonry. **Anura**, or **ANOURA** (a-nū'ra; Gr. *a*, negative, *oura*, a tail), an order of Batrachians which lose the tail when they reach maturity, such as the frogs and toads.

Anuradhapura. See *Anarajapura*.

Anville, D', JEAN BAPTISTE BOURGUIGNON, (jän báp-těst bör-gé-nyôn düp-vël), a celebrated French geographer, born in 1697, died in 1782.

Anzacs, a name given to the troops from Australia and New Zealand who fought in the European war (q. v.). It is derived from the initials of the two British colonies.

Anzin (än-zän), a town of France, department of Nord, about 1 mile northwest from Valenciennes, in the center of an extensive coal-field, with blast-furnaces, forges, rolling-mills, foundries, etc. Pop. (1906) 14,077.

Aonia (a-on'i-a), in ancient geography a name for part of Bœotia in Greece, containing Mount Helicon and the fountain Aganippe, both haunts of the muses.

Aorist (ä'ö-ris), the name given to one of the tenses of the verb in some languages (as the Greek), which expresses indefinite past time.

Aorta (a-or'ta), in anatomy, the great artery or trunk of the arterial system, proceeding from the left ventricle of the heart, and giving origin to all the arteries except the pulmonary. It first rises towards the top of the breast-bone, when it is called the *ascending aorta*; then makes a great curve, called the *transverse or great arch of the aorta*, whence it gives off branches to the head and upper extremities; thence proceeding towards the lower extremities, under the name of the *descending aorta*, it gives off branches to the trunk; and finally divides into the two iliaes, which supply the pelvis and lower extremities.

Aosta (ä-os'tä; anc. Augusta Prætoria), a town of North Italy, 50 miles N. N. W. of Turin.

Aoudad (a'ou-dad), the *Ammotragus tragelaphus*, a quadruped allied to the sheep, most closely to the moufflon, from which, however, it may be easily distinguished by the heavy mane, commencing at the throat and falling as far as the knees. It is a native of North Africa, inhabiting the loftiest and most inaccessible precipices.

Apaches (ä-pä'chez), a warlike race of Indians formerly inhabiting the more unsettled parts of the United States adjoining Mexico, and also the north of Mexico. They supported themselves by the chase and plunder and

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put their prisoners to death with frightful tortures. After defying the U. S. army for many years they were finally subdued by Generals Crook and Miles, and are now on reservations in Arizona, New Mexico and Oklahoma. They have proved good workers on the irrigation dams in Arizona. Number, about 6000.

Apanage (ap'a-nāj), an allowance which the younger princes of a reigning house in some European countries receive from the revenues of the country, generally with a grant of public domains, that they may be enabled to live in a manner becoming their rank.

Apartment (a-part'ment) **HOUSES**, houses built to accommodate a number of families each in its own set of rooms, which form a separate dwelling with an entrance of its own. The term is chiefly used in America, where such dwellings are of comparatively recent introduction; but houses of this kind have long been built in Europe, though in London, as in the United States, they are still somewhat of a novelty. In New York and other American cities there are now great blocks of such houses.

Apatite (ap'a-tīt), a translucent but seldom transparent mineral, which crystallizes in a regular six-sided prism, usually terminated by a truncated six-sided pyramid. It passes through various shades of color, from white to yellow, green, blue, and occasionally red; luster is vitreous inclining to sub-resinous; cleavage imperfect; hardness 5 and specific gravity about 3.2. It is a compound of phosphate of lime with fluoride and chloride of calcium. It occurs principally in primitive rocks and in veins, extensive deposits being found in all parts of the world. It is now largely utilized as a source of artificial phosphate manure.

Ape (āp), a common name of a number of quadrumanous animals inhabiting the Old World (Asia and the Asiatic islands and Africa), and including a variety of species. The word *ape* is applied indiscriminately to all quadrumanous mammals, or specifically to the anthropoid or man-like monkeys. This family includes the chimpanzee, gorilla, orang-outang, and gibbon, and has been divided into three genera, *Troglodytes*, *Simia*, and *Hylobates*. See *Chimpanzee*, *Gibbon*, *Gorilla*, *Orang*, etc.

Apeldoorn (ā'pel-dōrn), a town of Holland, province of Gelderland, 17 miles north of Arnhem; manufactures paper, morocco leather, and copper plates. Pop. 25,761.

Apennines

Apelles (a-pel'ēs), the most famous of the painters of ancient Greece and of antiquity, was born in the fourth century B.C., probably at Colophon. Ephorus of Ephesus was his first teacher, but attracted by the renown of the Sicyonian school he went and studied at Sicyon. In the time of Philip he went to Macedonia, and there a close friendship between him and Alexander the Great was established. The most admired of his pictures was that of Venus rising from the sea and wringing the water from her dripping locks. His portrait of Alexander with a thunderbolt in his hand was no less celebrated. His renown was at its height about B.C. 330, and he died about the end of the century. Among the anecdotes told of Apelles is the one which gave rise to the Latin proverb, 'Ne sutor supra crepidam'—'Let not the shoemaker go beyond his shoe.' Having heard a cobbler point out an error in the drawing of a shoe in one of his pictures he corrected it, whereupon the cobbler took upon him to criticize the leg and received from the artist the famous reply.

Apennines (ap'e-nīnz; Latin, *Mons Apenninus*), a prolongation of the Alps, forming the 'backbone of Italy.' Beginning at Savona, on the Gulf of Genoa, the Apennines traverse the whole of the peninsula and also cross over into Sicily, the Strait of Messina being regarded merely as a gap in the chain. The average height of the mountains composing the range is about 4,000 feet, and nowhere do they reach the limits of perpetual snow, though some summits exceed 9,000 feet in height. Monte Corno, a peak in the Gran Sasso d'Italia (Great Rock of Italy), which rises among the mountains if the Abruzzi, is the loftiest of the chain, rising to the height of 9541 feet, Monte Majella (9151) being next. Monte Gargano, which juts out into the Adriatic from the ankle of Italy, is a mountainous mass upwards of 3000 feet high, completely separated from the main chain. On the Adriatic side the mountains descend more abruptly to the sea than on the western or Mediterranean side, and the streams are comparatively short and rapid. On the western side are the valleys of the Arno, Tiber, Garigliano, and Volturno, the largest rivers that rise in the Apennines, and the only ones of importance in the peninsular portion of Italy. They consist almost entirely of limestone rocks, and are exceedingly rich in the finest marbles. On the south slopes volcanic masses are not uncommon. Mount Vesuvius, the only active volcano on the

continent of Europe, is an instance. The lower slopes are well clothed with vegetation; the summits are sterile and bare.

Apenrade (ä-pen-rä-de), a seaport of Prussia, in Schleswig-Holstein, on a fiord of the Little Belt, beautifully situated, and carrying on a considerable fishing and seafaring trade. Pop. 5,952.

Aperient (a-pè'ri-ent), a medicine which, in moderate doses, gently but completely opens the bowels: examples, castor-oil, Epsom salts, senna, etc.

Apetalous (a-pet'a-lus), a botanical term applied to flowers or flowering-plants which are destitute of petals or corolla.

Aphaniptera (af-a-nip'tèr-a), an order of wingless insects, composed of the different species of fleas. See *Flea*.

Aphasia (a-fä'si-a), a word of Greek origin signifying, in pathology, a symptom of certain morbid conditions of the nervous system in which the patient loses the power of expressing ideas by means of words, or loses the appropriate use of words, the vocal organs the while remaining intact and the intelligence sound. There is sometimes an entire loss of words as connected with ideas, and sometimes only the loss of a few. In one form of the disease, called *aphemia*, the patient can think and write, but cannot speak; in another, called *agraphia*, he can think and speak, but cannot express his ideas in writing. In a great majority of cases, where post-mortem examinations have been made, morbid changes have been found in the left frontal convolutions of the brain.

Aphelion (a-fè'li-on; Gr. *apo*, from, and *hèlios*, the sun), that part of the orbit of the earth or any other planet in which it is at the point remotest from the sun.

Aphemia (a-fè'mi-a). See *Aphasia*.

Aphides (ä'f-i-dèz). See *Aphis*.

Aphis (ä'fis), a genus of insects called plant-lice of the order Hemiptera, the type of the family Aphidæ. The species are very numerous and destructive. The *A. rosæ* lives on the rose; the *A. fabæ* on the bean; the *A. humuli* is injurious to the hop, the *A. granaria* to cereals, the *A. lanigera* or woolly aphis equally so to apple trees. The aphides are furnished with an infected beak, and feelers longer than the thorax. In the same species some individuals have four erect wings and others

are entirely without wings. The feet are of the ambulatory kind, and the abdomen usually ends in two horn-like tubes, from which is ejected the substance called



Aphides.

Wheat Plant-louse (*Aphis granaria*).—1, 2, Male, enlarged and natural size. 3, 4, Wingless Female, enlarged and natural size.

honey-dew, a favorite food of ants. (See *Ant*.) The aphides illustrate parthenogenesis; hermaphrodite forms produced from eggs produce viviparous wingless forms, which again produce others like themselves, and thus multiply during summer, one individual giving rise to millions. Winged sexual forms appear late in autumn, the females of which, being impregnated by the males, produce eggs.

Aphonia (a-fō'ni-a; Gr. *a*, not, and *phōnè*, voice), in pathology, the greater or less impairment or the complete loss of the power of emitting vocal sound. The slightest and less permanent forms often arise from extreme nervousness, fright, and hysteria. Slight forms of structural aphonia are of a catarrhal nature, resulting from more or less congestion and tumefaction of the mucous and submucous tissues of the larynx and adjoining parts. Severe cases are frequently occasioned by serous infiltration into the submucous tissue, with or without inflammation of the mucous membrane of the larynx and of its vicinity. The voice may also be affected in different degrees by inflammatory affections of the fauces and tonsils; by tumors in these situations; by morbid growths pressing on or implicating the larynx or trachea; by aneurisms; and most frequently by chronic laryngitis and its consequences, especially thickening, ulceration, etc.

Aphorism (ä'f-o-rizm), a brief, sententious saying, in which a comprehensive meaning is involved, as 'Familiarity breeds contempt;' 'Necessity has no law.'

Aphrodisiacs (a-fro-dis'i-aks), medicines or food believed to be capable of exciting sexual desire.

Aphrodite (äf-ro-dī'tè), the goddess of love among the Greeks;

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Aphthæ

usually regarded as equivalent to the Roman Venus. A festival called Aphrodisia was celebrated to her in various parts of Greece, but especially in Cyprus. See *Venus*.

Aphthæ (af'thæ), a disease occurring especially in infants, but occasionally seen in old persons, and consisting of small white ulcers upon the tongue, gums, inside of the lips, and palate, resembling particles of curdled milk: commonly called *thrush* or *milk-thrush*.

Apia (a'pè-a), the chief place and trading center of the Samoan Islands, on the north side of the island of Upolu, capital of the German part of the group.

Apiary (ā'pi-a-ri; L. *apis*, a bee), a place for keeping bees. The apiary should be well sheltered from strong winds, moisture, and the extremes of heat and cold. The hives should face the south or southeast, and should be placed on shelves 2 feet above the ground, and about the same distance from each other. As to the form of the hives and the materials of which they should be constructed there are great differences of opinion. The old dome-shaped straw skep is still in general use among the cottagers of Great Britain. Its cheapness and simplicity of construction are in its favor, while it is excellent for warmth and ventilation; but it has the disadvantage that its interior is closed to inspection, and the honey can only be got out by stupefying the bees with the smoke of the common puff-ball, by chloroform, or by fumigating with sulphur, which entails the destruction of the swarm. Wooden hives of square box-like form have now gained general favor among bee-keepers. They usually consist of a large breeding chamber below and two sliding removable boxes called supers above for the abstraction of honey without disturbing the contents of the main chamber. It is of great importance that the apiary should be situated in the neighborhood of good feeding grounds, such as gardens, clover-fields, or heath-covered hills. In the early spring slow and continuous feeding (a few ounces of syrup each day) will stimulate the queen to deposit her eggs, by which means the colony is rapidly strengthened and throws off early swarms. New swarms may make their appearance as early as May and as late as August, but swarming usually takes place in the intervening months.

Apicius (a-pish'e-us), MARCUS GABRIUS, a Roman epicure in the time of Augustus and Tiberius, who, having exhausted his vast fortune on the

gratification of his palate, and having only about \$400,000 left, poisoned himself that he might escape the misery of plain diet. The book of cookery published under the name of Apicius was written by one Caelius, and belongs to a much later date.

Apion (ā'pi-on), a Greek grammarian, born in Egypt, lived in the reigns of Tiberius, Caligula, and Claudius, A.D. 15-54, and went to Rome to teach grammar and rhetoric. Among his works, one or two fragments only of which remain, was one directed against the Jews, which was replied to by Josephus.

Apios (ā'pi-os), a genus of leguminous climbing plants, producing edible tubers on underground shoots. An American species (*A. apios*) has been used as a substitute for the potato, but its tubers, though numerous, are small.

Apis (ā'pis), a bull to which divine honors were paid by the ancient Egyptians, who regarded him as a symbol of Osiris. At Memphis he had a splendid residence, containing extensive walks and courts for his entertainment, and he was waited upon by a large train



Apis.

of priests, who looked upon his every movement as oracular. He was not suffered to live beyond twenty-five years, being secretly killed by the priests and buried with great pomp. Another bull, characterized by certain marks, as a black color, a triangle of white on the forehead, a white crescent-shaped spot on the breast, etc., was selected in his place. His birthday was annually celebrated, and his death was a season of public mourning.

Apis, a genus of insects. See *Bee*.

Apium (ā'pi-um), a genus of umbelliferous plants, including celery.

Aplacental (ap-la-sen'tal), a term applied to those mammals in which the young are destitute of a placenta. The aplacental mammals com-

prise the Monotremata and Marsupialia, the two lowest orders of mammals, including the duck-mole (*ornithorhynchus*), the porcupine ant-eater, kangaroo, etc. See *Marsupialia* and *Monotremata*.

Aplanatic (ap-la-nat'ik), in optics, a term specifically applied to reflectors, lenses, and combinations of them capable of transmitting light without spherical aberration. An *aplanatic lens* is a lens constructed of different media to correct the effects of the unequal refrangibility of the different rays.

Aplysia (a-pli'si-a). See *Sea-hare*.

Apocalypse (a-pok'a-lips; Gr. *apokalypsis*, a revelation), the name frequently given to the last book of the New Testament, in the English version called *The Revelation of St. John the Divine*. It is generally believed that the Apocalypse was written by the apostle John in his old age (95-97 A.D.) in the Isle of Patmos, whither he had been banished by the Roman Emperor Domitian. Anciently its genuineness was maintained by Justin Martyr, Irenæus, Clement of Alexandria, Tertullian, and many others; while it was doubted by Dionysius of Alexandria, Cyril of Jerusalem, Chrysostom, and, nearer our own times, by Luther and a majority of the eminent German commentators. The Apocalypse has been explained differently by almost every writer who has ventured to interpret it, and has furnished all sorts of sects and fanatics with quotations to support their creeds or pretensions. The modern interpreters may be divided into three schools—namely, the *historical school*, who hold that the prophecy embraces the whole history of the church and its foes from the time of its writing to the end of the world; the *Præterists*, who hold that the whole or nearly the whole of the prophecy has been already fulfilled, and that it refers chiefly to the triumph of Christianity over Paganism and Judaism; and the *Futurists*, who throw the whole prophecy, except the first three chapters, forward upon a time not yet reached by the church—a period of no very long duration, which is immediately to precede Christ's second coming.

Apocalyptic (a-pok-a-lip'tik) **NUMBER**, the mystic number 666 found in Rev., xiii, 18. As early as the second century ecclesiastical writers found that the name Antichrist was indicated by the Greek characters expressive of this number. By Irenæus the word *Lateinos* was found in the letters of the number, and the Roman empire was

therefore considered to be Antichrist. Protestants generally believe it has reference to the papacy, and, on the other hand, Catholics connect it with Protestantism.

Apocarpous (ap-o-kar'pus), in botany, a term applied to such fruits as are the product of a single flower, and are formed of one carpel, or a number of carpels free and separate from each other.

Apocrypha (a-pok'ri-fa; Greek, things concealed or spurious'), a term applied in the earliest churches to various sacred or professedly inspired writings, sometimes given to those whose authors were unknown, sometimes to those with a hidden meaning, and sometimes to those considered objectionable. The term is specially applied to the fourteen undermentioned books which were written during the two centuries preceding the birth of Christ. They were written, not in Hebrew, but in Greek, and the Jews never allowed them a place in their sacred canon. They were incorporated into the Septuagint, and thence passed to the Vulgate. The Greek Church excluded them from the canon in 360 at the Council of Laodicea. The Latin Church treated them with more favor, but it was not until 1546 that they were formally admitted into the canon of the Church of Rome by a decree of the Council of Trent. The Anglican Church says they may be read for example of life and instruction of manners, but that the church does not apply them to establish any doctrine. Fourteen books form the Apocrypha of the English Bible:—The first and second books of *Esdras*, *Tobit*, *Judith*, the rest of the *Book of Esther*, the *Wisdom of Solomon*, the *Wisdom of Jesus the son of Sirach*, or *Ecclesiasticus*, *Baruch the Prophet*, the *Song of the Three Children*, *Susanna and the Elders*, *Bel and the Dragon*, the *Prayer of Manasses*, and the first and second *Books of Maccabees*. Besides the Apocryphal books of the Old Testament there are many spurious books composed in the earlier ages of Christianity, and published under the names of Christ and his apostles, or of such immediate followers as from their character or means of intimate knowledge might give an apparent plausibility for such forgeries. These writings comprise: 1st, the *Apocryphal Gospels*, which treat of the history of Joseph and the Virgin before the birth of Christ, of the infancy of Jesus, and of the acts of Pilate; 2d, the *Apocryphal Acts of the Apostles*; and 3d, the *Apocryphal Apocalypses*, none of

Apocynaceae

which have obtained canonical recognition by any of the churches. See *Apocryphal Books of the New Testament*.

Apocynaceae (ap-o-ci-ná'se-é), a natural order of dicotyledonous plants, having for its type the genus *Apocynum* or dog-bane. The species have opposite or sometimes whorled leaves without stipules; the corolla monopetalous, hypogynous and with the stamens inserted upon it; fruit two-celled. The plants yield a milky juice, which is generally poisonous; several yield caoutchouc, and a few edible fruits. The bark of several species is a powerful febrifuge. To the order belongs the periwinkle (*Vinca*). See *Dog-bane*, *Cow-tree*, *Periwinkle*, *Oleander*, *Tanghais*.

Apoda (ap'ô-da; lit. footless animals), a name sometimes given to the snake-like or worm-like amphibians, as also to the apodal fishes (which see).

Ap'odal Fishes, the name applied to such malacocephalous fishes as want ventral fins. They constitute a small natural family, of which the common eel is an example.

Apodosis (a-pod'ô-sis), in gram., the latter member of a conditional sentence or one beginning with *if, though, etc.* dependent on the condition or *protasis*; as, 'if it rain (*protasis*) I shall not go' (*apodosis*).

Apogee (ap'ô-jé; Greek, *apo*, from, and *gê*, the earth), that point in the orbit of the moon or a planet where it is at its greatest distance from the earth; properly this particular part of the moon's orbit.

Apol'da, a town of Germany, in Saxewimar, at which woolen goods are extensively manufactured. Pop. 20,352.

Apollinarians (ap-ol-i-ná'ri-ans), a sect of Christians who maintained the doctrine that the Logos (the Word) holds in Christ the place of the rational soul, and consequently that God was united in him with the human body and the sensitive soul. Apollinaris, the author of this opinion, was, from A.D. 362 till at least A.D. 382, Bishop of Laodicea, in Syria, and a zealous opposer of the Arians. As a man and a scholar he was highly esteemed and was among the most popular authors of his time. He formed a congregation of his adherents at Antioch, and made Vitalis their bishop. The *Apollinarians*, or *Vitalians*, as their followers were called, soon spread their sentiments in Syria and the neighboring countries, established several societies, with their own bishops, and one even in Constan-

tinople; but the sect was finally merged into the Monophysite school.

Apollinaris (a-pol-i-ná'ris) WATER, a natural aerated water, belonging to the class of alkaline mineral waters, and derived from the Apollinaris-brunnen, a spring in the valley of the Ahr, near the Rhine, in Rhenish Prussia, forming a highly esteemed beverage.

Apollo (a-pol'lo), son of Zeus (Jupiter) and Leto (Lotano), who being persecuted by the jealousy of Hera (Juno), after tedious wanderings and nine days' labor, was delivered of him and his twin sister, Artemis (Diana), on the island of Delos. Skilled in the use of the bow, he slew the serpent Python on the fifth day after his birth; afterwards, with his sister Artemis, he



Appollo, from a bas-relief at Rome.

killed the children of Niobé. He aided Zeus in the war with the Titans and the giants. He destroyed the Cyclops, because they forged the thunderbolts with which Zeus killed his son and favorite Asklepios (*Æsculapius*). According to some traditions, he invented the lyre, though this is generally ascribed to Hermes (Mercury). Apollo was originally the sun-god; and though in Homer he appears distinct from Helios (the sun), yet his real nature is hinted at even here by the epithet *Phœbus*, that is, the radiant or beaming. In later times the view was almost universal that Apollo and Helios were identical. From being the god of light and purity in a physical sense he gradually became the god of moral and spiritual light and purity, the source of all intellectual, social, and political progress. He thus came to be regarded as the god of song and prophecy, the

god that wards off and heals bodily suffering and disease, the institutor and guardian of civil and political order, and the founder of cities. His worship was introduced at Rome at an early period, probably in the time of the Tarquins. Among the ancient statues of Apollo that have come down to us, the most remarkable is the one called the *Apollo Belvidere*, from the Belvidere Gallery in the Vatican at Rome. This statue was found in the ruins of Antium in 1495, and was purchased by Pope Julian II. It is thought to be a copy of a Greek statue of the 3d century B.C., and to date from the reign of Nero.

Apollodorus (ap-pol-o-dō'rūs), a Greek painter who flourished 404 B.C. The first of the great school of Greek painters, elder contemporary of Zeuxis and Parrhasius. Considered the inventor of *chiaroscuro*. Among his works are an *Odysseus*, a priest in prayer, and an Ajax struck by lightning.

Apollonius (a-pol-lō'nī-us) OF PERGA, Greek mathematician, called the 'great geometer,' flourished about 240 B.C., and was the author of many works, only one of which, a treatise on Conic Sections, partly in Greek and partly in an Arabic translation, is now extant.

Apollonius of Rhodes, a Greek rhetorician and poet, flourished about 230 B.C. Of his various works we have only the *Argonautica*, an epic poem of moderate merit, though written with much care and labor, dealing with the story of the Argonautic expedition.

Apollonius of Tyana, in Cappadocia, a Pythagorean philosopher, who was born in the beginning of the Christian era, early adopted the Pythagorean doctrines, abstaining from animal food and maintaining a rigid silence for five years. He traveled extensively in Asia, professed to be endowed with miraculous powers, such as prophecy and the raising of the dead, and was on this account set up by some as a rival to Christ. His ascetic life, wise discourses, and wonderful deeds obtained for him almost universal reverence, and temples, altars, and statues were erected to him. He died at Ephesus about the end of the first century. A narrative of his strange career, containing many fables, with, perhaps, a kernel of truth, was written by the Philostratus about a century later.

Apollonius of Tyre, the hero of a tale which had an immense popularity in the middle

ages and which furnished the plot of Shakespeare's *Pericles, Prince of Tyre*. The story, originally in Greek, first appeared in the third century after Christ.

Apollos (a-pol'los), a Jew of Alexandria, who learned the doctrines of Christianity at Ephesus from Aquila and Priscilla, became a preacher of the gospel in Achaia and Corinth, and an assistant of Paul in his missionary work. Some have regarded him as the author of the Epistle to the Hebrews.

Apollyon (a-pol'yūn; 't h e D e - stroyer'), a name used in Rev. ix, 11, for the angel of the bottomless pit.

Apologetics (a-pol-o-jet'iks), a term applied to that branch of theological learning which consists in the systematic exhibition of the arguments for the divine origin of Christianity. See *Evidence of Christianity*.

Apologue (ap'o-log), a story or relation of fictitious events intended to convey some useful truths. It differs from a parable in that the latter is drawn from events that pass among mankind, whereas the apologue may be founded on supposed actions of brutes or inanimate things. *Aesop's fables* are good examples of apologues.

Apology (a-pol'o-ji), a term at one time applied to a defense of one who is accused, or to certain doctrines called in question. Of this nature are the *Apologies of Socrates*, attributed respectively to Plato and Xenophon. The name passed over to Christian authors, who gave the name of apologies to the writings which were designed to defend Christianity against the attacks and accusations of its enemies, particularly the pagan philosophers, and to justify its professors before the emperors. Of this sort were those by Justin Martyr, Athenagoras, Tertullian, Tatian, and others.

Aponeurosis (ap-o-nū-rō'sis), in anatomy, a name of certain grayish-white lining membranes, composed of interlacing fibers, sometimes continuous with the muscular fiber, and differing from tendons merely in having a flat form. They serve several purposes, sometimes attaching the muscles to the bones, sometimes surrounding the muscle and preventing its displacement, etc.

Apophthegm (ap'o-them), a short pithy sentence or maxim. Plutarch made a famous collection of them, and we have a collection by Lord Bacon.

Apophyllite (a-pof'il-lit), a species of mineral of a foliated structure and pearly luster, called also fish-eye stone. It belongs to the Zeolite

family, and is a hydrated silicate of lime and potash, containing also fluorine.

Apoplexy (ap'o-plek-si), abolition or sudden diminution of sensation and voluntary motion, from suspension of the functions of the cerebrum, resulting from congestion or rupture of the blood-vessels of the brain and resulting pressure on this organ. In a complete apoplexy the person falls suddenly, is unable to move his limbs or to speak, gives no proof of seeing, hearing, or feeling, and the breathing is stertorous or snoring, like that of a person in deep sleep. The premonitory symptoms of this dangerous disease are drowsiness, giddiness, dullness of hearing, frequent yawning, disordered vision, noise in the ears, vertigo, etc. It is most frequent between the ages of fifty and seventy. A large head, short neck, full chest, sanguine and plethoric constitution, and corpulency are generally considered signs of predisposition to it; but the state of the heart's action, with a plethoric condition of the vascular system, has a more marked influence. Out of 63 cases carefully investigated only 10 were fat and plethoric, 23 being thin, and the rest of ordinary habit. Among the common predisposing causes are long and intense thought, continued anxiety, habitual indulgence of the temper and passions, sedentary and luxurious living, sexual indulgence, intoxication, etc. More or less complete recovery from a first and second attack is common, but a third is almost invariably fatal.

Apopsiopsis (a-pō-si-ō-pē'sis), in rhetoric, a sudden break or stop in speaking or writing, usually for mere effect or a pretense of unwillingness to say anything on a subject; as 'his character is such—but it is better I should not speak of that.'

Apostasy (a-pos'ta-si; Gr. *apostasis*, a standing away from), a renunciation of opinions or practices and the adoption of contrary ones, usually applied to renunciation of religious opinions. It is always an expression of reproach. What one party calls *apostasy* is termed by the other *conversion*. Catholics, also, call those persons *apostates* who forsake a religious order or renounce their religious vows without a lawful dispensation.

A posteriori (a pos-tē-ri-ō-ri). See *A priori*.

Apostles (ā-pos'ls; literally persons sent out; from the Greek *apostellein*, 'to send out'), the twelve men whom Jesus selected to attend him during his ministry, and to promulgate his religion. Their names

were as follows:—Simon Peter, and Andrew his brother; James, and John his brother, sons of Zebedee; Philip; Bartholomew; Thomas; Matthew; James, the son of Alphaeus; Lebbeus, his brother, called Judas or Jude; Simon, the Canaanite; and Judas Iscariot. To these were subsequently added Matthias (chosen by lot in place of Judas Iscariot) and Paul. The Bible gives the name of apostle to Barnabas also, who accompanied Paul on his missions (Acts, xiv, 14). In a wider sense those preachers who first taught Christianity in heathen countries are sometimes termed apostles. During the life of Jesus the apostles more than once showed a misunderstanding of the object of his mission, and during his sufferings evinced little courage and firmness of friendship for their great Teacher. After his death, according to the Bible account, they received the Holy Ghost on the day of Pentecost, that they might be enabled to fulfill the important duties for which they had been chosen. Their subsequent history is only imperfectly known.

Apostles' Creed, a well-known formula or declaration of Christian belief, formerly believed to be the work of the apostles themselves, but it can only be traced to the 4th century. See *Creed*.

Apostolic (ap-os-tol'ik), **APOSTOLICAL**, pertaining or relating to the apostles.—**Apostolic Church**, the church in the time of the apostles constituted according to their design. The name is also given to the four churches of Rome, Alexandria, Antioch, and Jerusalem, and is claimed by the Roman Catholic Church, and occasionally by the Episcopalians.—**Apostolic Constitutions and Canons**, a collection of regulations attributed to the apostles, but generally supposed to be spurious. They appeared in the fourth century; are divided into eight books, and consist of rules and precepts relating to the duty of Christians, and particularly to the ceremonies and discipline of the church.—**Apostolic fathers**, the Christian writers who during any part of their lives were contemporary with the apostles. They are Papias, Clement, Barnabas, Hermas, Ignatius, Polycarp.—**Apostolic majesty**, a title given by the pope to the Kings of Hungary, first conferred on St Stephen, the founder of the royal line of Hungary on account of what he accomplished in the spread of Christianity.—**Apostolic see**, the see of the popes or bishops of Rome: so called because the popes profess themselves the successors of St. Peter, its founder.—**Apostolic succession**, the un-

interrupted succession of bishops, and, through them, of priests and deacons (these three orders of ministers being called the *apostolical orders*), in the church by regular ordination from the first apostles down to the present day. All Episcopal churches hold theoretically, and the Roman Catholic Church and many members of the English Church strictly, that such succession is essential to the officiating priest, in order that grace may be communicated through his administrations.

Apostolics, APOSTOLICI, or APOSTOLIC BRETHREN, the name given to certain sects who professed to imitate the manners and practice of the apostles. The last and most important of these sects was founded about 1260 by Gerhard Segarelli of Parma. They went barefooted, begging, preaching, and singing throughout Italy, Switzerland, and France; announced the coming of the kingdom of heaven and of purer times; denounced the papacy, and its corrupt and worldly church; and inculcated the complete renunciation of all worldly ties, of property, settled abode, marriage, etc. This society was formally abolished, 1286, by Honorius IV. In 1300 Segarelli was burned as a heretic, but another chief apostle appeared—Dolcino, a learned man of Milan. In self-defense they stationed themselves in fortified places whence they might resist attacks. After having devastated a large tract of country belonging to Milan they were subdued, A.D. 1307, by the troops of Bishop Raynerius, in their fortress Zebello, in Vercelli, and almost all destroyed. Dolcino met death by torture. The survivors afterwards appeared in Lombardy and in Germany as late as 1403.

Apostrophe (a-pos'trō-fē; Greek, 'a turning away from'), a rhetorical figure by which the orator changes the course of his speech, and makes a short impassioned address to one absent as if he were present, or to things without life and sense as if they had life and sense. The same term is also applied to a comma when used to contract a word, or to mark the possessive case, as in 'John's book.'

Apothecaries' Weight, the weight used in dispensing drugs, in which the pound (lb.) is divided into 12 ounces (3), the ounce into 8 drachms (3), the drachm into 3 scruples (3), and the scruple into 20 grains (grs.), the grain being equivalent to that in avoirdupois weight.

Apothecary (a-poth'e-ka-ri), in a general sense, one who keeps a shop or laboratory for preparing,

compounding, and vending medicines, and for the making up of medical prescriptions. In England the term was long applied (as to some little extent still) to a regularly licensed class of medical practitioners, being such persons as were members of, or licensed by, the *Apothecaries' Company* in London. The apothecaries of London were at one time ranked with the grocers, with whom they were incorporated by James I in 1606. In 1617, however, the apothecaries received a new charter as a distinct company. The Apothecaries' Company have prescribed a course of medical instruction and practice for candidates for the license of the society. In the United States the several States have laws controlling apothecaries.

Apothecium (ap-ō-thē-si-um), in botany, the receptacle of lichens, consisting of the spore-cases or asci, and of the paraphyses or barren threads.

Apotheosis (ap-ō-thē-ō'sis; deification), a solemnity among the ancients by which a mortal was raised to the rank of the gods. The custom of placing mortals who had rendered their countrymen important services, among the gods was very ancient among the Greeks. The Romans, for several centuries, deified none but Romulus, and first imitated the Greeks in the fashion of frequent apotheosis after the time of Cæsar. From this period apotheosis was regulated by the decrees of the senate, and accompanied with great solemnities. The greater part of the Roman emperors were deified.

Appalachian Mountains (ap-pa-lā'chi-an), also called ALLEGHANIES, an important mountain range in N. America extending for 1300 miles from Cape Gaspé, on the Gulf of St. Lawrence, s.w. to Alabama. The system has been divided into three great sections: the *northern* (including the Adirondacks, the Green Mountains, the White Mountains, etc.), from Cape Gaspé to New York; the *central* (including a large portion of the Blue Ridge, the Alleghanies proper, and numerous lesser ranges), from New York to the valley of the New River; and the *southern* (including the continuation of the Blue Ridge, the Black Mountains, the Smoky Mountains, etc.), from the New River southwards). The chain consists of several ranges generally parallel to each other, the altitude of the individual mountains increasing on approaching the south. The highest peaks rise over 6000 feet (not one at all approaching the snow-level), but the mean height is about 2500

Appalachian Park

feet. Lake Champlain is the only lake of great importance in the system, but numerous rivers of considerable size take their rise here. Magnetite, hematite, and other iron ores occur in great abundance, and the coal-measures are among the most extensive in the world. Gold, silver, lead, and copper are also found, but not in paying quantities, while marble, limestone, fire-clay, gypsum, and salt abound. The forests covering many of the ranges yield large quantities of valuable timber, such as sugar-maple, white birch, beech, ash, oak, cherry-tree, white poplar, white and yellow pine, etc., while they form the haunts of large numbers of bears, panthers, wild cats, and wolves.

Appalachian Park. For a considerable number of years efforts were made to have Congress set aside the large areas in the southern Appalachians covered by hardwood timber as a national park, as a means of conserving the head-waters of the streams which flow there. A bill for this purpose was passed in 1911, also including the White Mountains of New England, the United States agreeing to cooperate with the States in the cost of this important enterprise.

Appalachicola (ap-a-la-chi-cō'la), a river of the United States, formed by the Chattahoochee and Flint Rivers, which unite near the northern border of Florida; length, about 100 miles; flows into the Gulf of Mexico, and is navigable.

Apanage. See *Apanage*.

Apparent (ap-pā'rent), among mathematicians and astronomers, applied to things as they appear to the eye, in distinction from what they really are. Thus they speak of apparent motion, magnitude, distance, height, etc. The *apparent magnitude* of a heavenly body is the angle subtended at the spectator's eye by the diameter of that body, and this, of course, depends on the distance as well as the real magnitude of the body; *apparent motion* is the motion a body seems to have in consequence of our own motion, as the motion of the sun from east to west, etc.

Apparition (ap-a-rish'un), according to a belief held by some, a disembodied spirit manifesting itself to mortal sight; according to the theory more generally entertained, an illusion involuntarily generated, by means of which figures or forms, not present to the actual sense, are nevertheless depicted with a vividness and intensity sufficient to create a temporary belief of their reality. Such illusions are now gener-

ally held to result from an overexcited brain, a strong imagination, or some bodily malady. This theory explains satisfactorily a large majority of the stories of apparitions; still there are some which it seems sufficient to account for.

Appeal (a-pēi), in legal phraseology, the removal of a cause from an inferior tribunal to a superior, in order that the latter may revise, and if it seem needful, reverse or amend, the decision of the former. The supreme court of appeal for Great Britain is the House of Lords. In Ireland there is also a Court of Appeal similar to that in England; while in Scotland the highest court is the Court of Session. In the United States the system of appeals differs in different States. In legislative bodies, an appeal is the act by which a member, who questions the correctness of a decision of the presiding officer, or chairman, demands a vote of the body upon the decision. In the House of Representatives of the United States the question of an appeal is put to the House in this form: 'Shall the decision of the chair stand as the judgment of the House?' If the appeal relates to an alleged breach of decorum, or transgression of the rules of order, the question is taken without debate. If it relates to the admissibility or relevancy of a proposition, debate is permitted, except when a motion for the previous question is pending.

Appendicitis (ap-pen-di-sī'tis), inflammation of the vermiform appendix, caused by obstructions at the mouth of the appendix or by extension of inflammation from the colon. It was formerly believed that foreign bodies, such as grape and other small seeds, were the main cause. This theory is now generally discarded. The appendix becomes swollen and filled with pus, tending to rupture, and peritonitis may result. Surgical operation for the removal of the appendix is justified in acute and repeated attacks.

Appenzell (ap'pen-tsel), a Swiss canton, wholly enclosed by the canton of St. Gall; area, 162 square miles. It is divided into two independent portions or half-cantons, Ausser-Rhoden, which is Protestant, and Inner-Rhoden, which is Catholic. It is an elevated district, traversed by branches of the Alps, Mount Sentis in the center being 8250 feet high. It is watered by the Sitter and by several smaller affluents of the Rhine. Glaciers occupy the higher valleys. Pop. 68,780.

Appetite (ap'e-tīt), in its widest sense, means the natural desire for gratification, either of the body

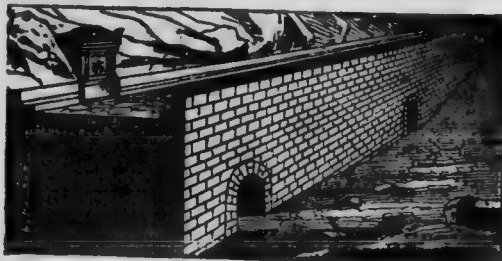
Appetite

or the mind; but is generally applied to the recurrent and intermittent desire for food. A healthy appetite is favored by work, exercise, plain living, and cheerfulness; absence of this feeling, or defective appetite (*anorexia*), indicates diseased action of the stomach, or of the nervous system or circulation, or it may result from vicious habits. Depraved appetite (*pica*), or a desire for unnatural food, as chalk, ashes, dirt, soap, etc., depends often in the case of children on vicious tastes or habits; in grown-up persons it may be symptomatic of dyspepsia, pregnancy, or chlorosis. Insatiable or canine appetite or voracity (*bulimia*) when it occurs in childhood is generally symptomatic of worms; in adults common causes are pregnancy, vicious habits, and indigestion caused by stomach complaints or gluttony, when the gnawing pains of disease are mistaken for hunger.

Appian (ap'pi-an), a Roman historian of the second century after Christ, a native of Alexandria, was governor and manager of the imperial revenues under Hadrian, Trajan, and Antoninus Pius, in Rome. He compiled in Greek a Roman history, from the earliest times to those of Augustus, in twenty-four books, of which only eleven have come down to us—of little value.

Appiani (äp-pi-ä'nē), ANDREA, a painter, born at Milan in 1754, died in 1817. As a fresco-painter he excelled every contemporary painter in Italy. He displayed his skill particularly in the cupola of Santa Maria di S. Celso at Milan, and in the paintings representing the legend of Cupid and Psyche, prepared for the walls and ceiling of the villa of the Archduke Ferdinand at Monza (1795). Napoleon appointed him royal court painter, and portraits of almost the whole of the imperial family were painted by him.

Appian Way, called *Regina Viarum*, the Queen of Roads: the oldest and most renowned Roman



Construction of a Portion of the Appian Way.

road, was constructed during the censorship of Appius Claudius Cæcus (B.C.

313-310). It was built with large square stones on a raised platform, and was made direct from the gates of Rome to Capua, in Campania. It was afterwards extended through Samnium and Apulia to Brundisium, the modern Brindisi. It was partially restored by Pius VI, and in 1850-53 it was excavated by order of Pius IX as far as the eleventh milestone from Rome.

Appius Claudius (ap'pi-us clä'di-us), surnamed *Cæcus*, or the blind, an ancient Roman, elected censor B.C. 312, which office he held five years. While in this position he instituted several great constitutional changes, and constructed the road and aqueduct named after him. He was subsequently twice consul, and once dictator. In his old age he became blind, but in B.C. 280 he made a famous speech in which he induced the senate to reject the terms of peace fixed by Pyrrhus. He is the earliest Roman writer of prose and verse whose name we know.

Appius Claudius Crassus, one of the Roman *decemvirs*, appointed B.C. 451 to draw up a new code of laws. He and his colleagues plotted to retain their power permanently, and at the expiration of their year of office refused to give up their authority. The people were incensed against them, and the following circumstances led to their overthrow. Appius Claudius had conceived an evil passion for Virginia, the daughter of Lucius Virginius, then absent with the army in the war with the Æqui and Sabines. At the instigation of Appius, Marcus Claudius, one of his clients, claimed Virginia as the daughter of one of his own female slaves, and the decemvir, acting as judge, decided that in the meantime she should remain in the custody of the claimant. Virginius, hastily summoned from the army, appeared with his daughter next day in the forum, and appealed to the people; but Appius Claudius again adjudged her to M. Claudius. Unable to rescue his daughter, the unhappy father stabbed her to the heart. The decemvirs were deposed by the indignant people B.C. 449, and Appius Claudius died in prison or was strangled.

Apple (ap'1; *Pyrus Malus*), the fruit of a well-known tree of the nat. order Rosaceæ, or the tree itself. The apple belongs to the temperate regions of the globe, over which it is almost universally spread and cultivated. The tree attains a moderate height, with spreading branches; the leaf is ovate; and the flowers are produced from the wood of the former year, but more generally from

very short shoots or spurs from wood of two years' growth. The original of all the varieties of the cultivated apple is the wild crab, which has a small and extremely sour fruit, and is a native of most of the countries of Europe. To the facility of multiplying varieties by grafting is to be ascribed the amazing extension of the sorts of apples. Many of the more marked varieties are known by general names, as pippins, codlins, rennets, etc. Apples for the table are characterized by a firm juicy pulp, a sweetish acid flavor, regular form, and beautiful coloring; those for cooking by the property of forming by the aid of heat into a pulpy mass of equal consistency, as also by their large size and keeping properties; apples for cider must have a considerable degree of astringency, with richness of juice. The propagation of apple trees is accomplished by seeds, cuttings, suckers, layers, budding, or grafting, the last being almost the universal practice. The tree thrives best in a rich deep loam or marshy clay, but will thrive in any soil provided it is not too wet or too dry. The wood of the apple tree or the common crab is hard, close-grained, and often richly colored, and is suitable for turning and cabinet work. The fermented juice (*verjuice*) of the crab is employed in cookery and medicine. Cider, the fermented juice of the apple, is a favorite drink in many parts of the United States. The designation apple, with various modifying words, is applied to a number of fruits having nothing in common with the apple proper, as alligator-apple (which see), love-apple (see *Tomato*), etc.

Appleby (ap'p'l-bē), county town of Westmoreland, England, on the Eden, 28 miles S. S. E. Carlisle, giving its name to a parliamentary division of the county. It has an old castle, the keep of which, called Cæsar's Tower, is still fairly preserved. Pop. 1736.

Apple of discord, according to the story in the Greek mythology, the golden apple thrown into an assembly of the gods by the goddess of discord (Eris) bearing the inscription 'for the fairest.' Aphrodītē (Venus), Hera (Juno), and Pallas (Minerva) became competitors for it, and its adjudication to the first by Paris so inflamed the jealousy and hatred of Hera to all of the Trojan race (to which Paris belonged) that she did not cease her machinations till Troy was destroyed.

Apple of Sodom, a fruit described by old writers as externally of fair appearance, but turning to ashes when plucked; probably the fruit of *Solanum sodomæum*.

Appleton (ap'p'l-tun), a city, capital of Outagamie Co., Wisconsin, 100 m. N. W. of Milwaukee by rail. It has abundant water power, operating many flour, paper, saw, and woolen mills, and other manufactories, also large breweries. It is the seat of a collegiate institute and of Lawrence University. Pop. 16,773.

Appoggiatura (ap-poj-a-tŭ'ra), in music, a small additional note of embellishment preceding the note to which it is attached, and taking away from the principal note a portion of its time.

Appomattox (a-pō-mat'oks), COURT-HOUSE, a village in Virginia, 23 m. E. of Lynchburg. Here on 9th April, 1865, Gen. Lee surrendered to Gen. Grant, and thus virtually concluded the American Civil war.

Apposition (ap-o-zish'un), in grammar, the relation in which one or more nouns or substantive phrases or clauses stand to a noun or pronoun, which they explain or characterize without being predicated of it, and with which they agree in case; as Cicero, the orator, lived in the first century before Christ; the opinion, a severe winter is generally followed by a good summer, is a vulgar error.

Appraiser (a-prā'zer), one who appraises; a person appointed and sworn to set a value upon things to be sold or otherwise requiring appraisement.

Apprehension (ap-rē-hen'shun), the capture of a person upon a criminal charge. The term *arrest* is applied to civil cases; as, a person having authority may *arrest* on civil process, and *apprehend* on a criminal warrant. See *Arrest*.

Apprentice (a-pren'tis), one bound by indenture to serve some particular individual for a specified time, in order to be instructed in some art, science, or trade. At common law an infant may bind himself apprentice by indenture, because it is for his benefit. But this contract, on account of its liability to abuse, has been regulated by statute in the United States, and is not binding upon the infant unless entered into by him with the consent of the parent or guardian, or by the parent or guardian for him, with his consent. The duties of the master are, to instruct the apprentice by teaching him the knowledge of the art which he had undertaken to teach him, though he will be excused for not making a good workman if the apprentice is incapable of learning the trade. He cannot dismiss his apprentice except

by consent of all the parties to the indenture. An apprentice is bound to obey his master in all his lawful commands, take care of his property, and promote his interests, and endeavor to learn his trade or business, and perform all the covenants in his indenture not contrary to law. He must not leave his master's service during the term of his apprenticeship. The custom of apprenticing has greatly declined of late years in this country, and manual training and trade schools have been instituted for the teaching of the use of tools in various trades.

Approaches (a-pröch'es), zigzag trenches made to connect the parallels in besieging a fortress.

Appropriation (a-prö-pri-ä'shun), an act of a legislative body setting aside a sum of money from the treasury for a specific purpose. In the United States no money can be drawn from the U. S. government treasury except in consequence of appropriations made by Congress (Constitution, Art. I). Under this clause it is necessary for Congress to appropriate money for the support of the Federal government and in payment of claims against it. In the House of Representatives appropriation bills have precedence. Similar laws exist in the several States and in Britain and other countries.

Approximation (a-prok-si-mä'shun), a term used in mathematics to signify a continual approach to a quantity required, when no process is known for arriving at it exactly. Although, by such an approximation, the exact value of a quantity cannot be discovered, yet, in practice, it may be found sufficiently correct; thus the diagonal of a square, whose sides are represented by unity, is $\sqrt{2}$, the exact value of which quantity cannot be obtained; but its approximate value may be substituted in the nicest calculations.

Appuleius (ap-pü-lë'us). See *Apu-letius*.

Apricot (äp'ri-kot; *Prunus Armeniaca*), a fruit of the plum genus which was introduced into Europe from Asia more than three centuries before Christ, and into England in the first half of the sixteenth century. It is a native of Armenia and other parts of Asia and also of Africa. The apricot is a low tree, of rather crooked growth, with somewhat heart-shaped leaves and sessile flowers. The fruit is sweet, more or less juicy, of a yellowish color, about the size of the peach, and somewhat resembling it in delicacy of flavor. The wood is coarsely grained and soft. Apricot trees

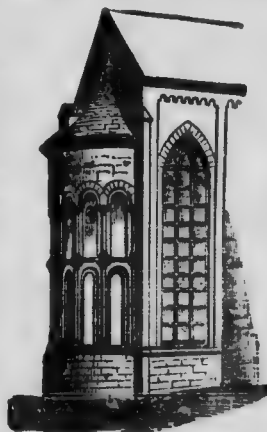
have been introduced into California, where they are largely grown.

Apries (ä'pri-ës), Pharaoh-Hophra of Scripture, the fourth king of the twenty-sixth Egyptian dynasty. He succeeded his father Psammetichus in 590 or 588 B.C. The Jews under Zedekiah revolted against their Babylonian oppressors and allied themselves with Apries, who was, however, unable to raise the siege of Jerusalem, which was taken by Nebuchadnezzar. A still more unfortunate expedition against Cyrene brought about revolt in his army, in endeavoring to suppress which Apries was defeated and slain about B.C. 569.

April (ä'pril; Lat. *Aprilis*, from *aperire*, to open, because the buds open at this time), the fourth month of the year. The strange custom of making fools on the 1st April by sending people upon errands and expeditions which end in disappointment, and raise a laugh at the expense of the person sent has long prevailed. It has been connected with the miracle plays of the middle ages, in which the Saviour was represented as having been sent, at this period of the year, from Annas to Caiphas and from Pilate to Herod. In France the party fooled is called *un poisson d'avril*, 'an April fish.'

A priori (ä pri-ö'ri; 'from what goes before'), a phrase applied to a mode of reasoning by which we proceed from general principles or notions to particular cases, as opposed to a *posteriori* ('from what comes after') reasoning, by which we proceed from knowledge previously acquired. Mathematical proofs are of the *a priori* kind; the conclusions of experimental science are a *posteriori*. It is also a term applied to knowledge independent of all experience.

Apsé (aps), a portion of any building forming a termination or projection semicircular or polygonal in plan, and having a roof forming externally a semi-dome or semicone, or having ridges corresponding to the angles of the polygon; especially such a semicircular or polygonal recess projecting from the east



Apsé—Laach, Germany.

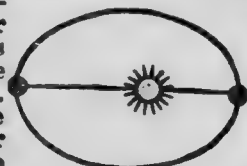
Apsheron

end of the choir or chancel of a church, in which the altar is placed. The apse was developed from the somewhat similar part of the Roman basilica, in which the magistrate (*prætor*) sat.

Apsheron (äp'sha-ron), a peninsula on the western shore of the Caspian Sea formed by the eastern extremity of the Caucasus Mountains. It extends for about 40 m., and terminates in Cape Apsheron. It yields immense quantities of petroleum. See *Baku*.

Apsis (ap'sis), pl. *APSIDES* or *APSIDES*, in astronomy one of the two points of the orbit of a heavenly body situated at the extremities of the major axis of the ellipse formed by the orbit, one of the points being that at which the body is at its greatest and the other that at which it is at its least distance from its primary.

In regard to the earth and the other planets, these two points correspond to the aphelion and perihelion; and in regard to the moon they correspond to the apogee and perigee. The line of the apsides has a slow forward angular motion in the plane of the planet's orbit, being retrograde only in Venus. This in the earth's orbit produces the anomalistic year. See *Anomaly*.



aa, Apsides.

Apt (äpt; anc. *Apta Julia*), a town of southern France, department Vaucluse, 32 miles E. by S. of Avignon, with an ancient Gothic cathedral. Pop. 4990.

Aptera (ap'te-ra), wingless insects, such as lice and certain others.

Apteryx (ap'tér-iks), a nearly extinct genus of cursorial birds, distinguished from the ostriches by having three toes with a rudimentary hallux, which forms a spur. They are natives of the South Island of New Zealand; are totally wingless and tailless, with feathers resembling hairs; about the size of a small goose; with long curved beak something like that of a curlew. They are entirely nocturnal, feeding on insects, worms, and seeds.—*A. australis*, called *Kiwi-kiwi* from its cry, is the best-known species.

Apuleius, or **APPULEIUS** (ap-ü-lé'us), author of the celebrated satirical romance in Latin called the *Golden Ass*, born at Madaura, in Numidia, in the early part of the second century A.D.; the time of his death unknown. He studied at Carthage, then at Athens, where he became warmly attached, in particular, to the Platonic philosophy,

and finally at Rome. Returning to Carthage he married a rich widow, whose relatives accused him of gaining her consent by magic, and the speech by which he successfully defended himself is still extant. Besides his *Golden Ass*, with its fine episode of *Cupid and Psyche*, he was also the author of many works on philosophy and rhetoric, some of which are still extant.

Apulia (a-pü'li-a), a department or division in the southeast of Italy, on the Adriatic, composed of the provinces of Foggia, Bari, and Lecce; area, 7376 sq. miles; pop. 1,959,668.

Apure (ä-pö'rä), a navigable river of Venezuela, formed by the junction of several streams which rise in the Andes of Colombia; it falls into the Orinoco.

Apurimac (ä-pö-ré'mäk), a river of South America, which rises in the Andes of Peru, and being augmented by the Mantaro and other streams forms the Ucayale, one of the principal headwaters of the Amazon. It is not navigable.

Aqua (ä'kwa or ak'wa; Latin for water), a word much used in pharmacy and old chemistry.—*Aqua fortis* (=strong water), a weak and impure nitric acid. It has the power of eating into steel and copper, and hence is used by engravers, etchers, etc.—*Aqua marina*, a fine variety of beryl. See *Aquamarine*.—*Aqua regia*, or *aqua regalis* (=royal water), a mixture of nitric and hydrochloric acids (in the proportion of one to four), having the power of dissolving gold and other noble metals.—*Aqua Tofana*, a poisonous fluid made about the middle of the seventeenth century by an Italian woman Tofana or Toffania, who is said to have procured the death of no fewer than 600 individuals by means of it. It consisted chiefly, it is supposed, of a solution or crystallized arsenic.—*Aqua vitæ* (=water of life), or simply *aqua*, a name familiarly applied to the whisky of Scotland, corresponding in meaning with the *usquebaugh* of Ireland, the *eau de vie* (brandy) of the French.

Aqua Fortis. See preceding article.

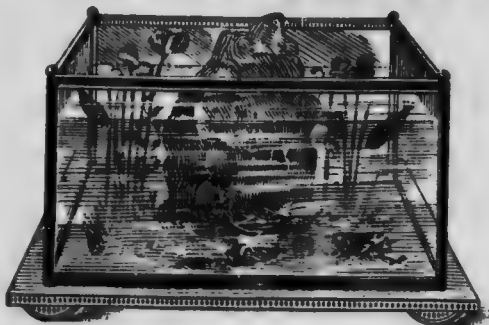
Aquamarine (ä'kwa-ma-rén), a name given to some of the finest varieties of beryl of a sea-green or blue color. Hence applied to a bluish-green color resembling that of beryl.

Aquarium (a-kwä'ri-um), a vessel or series of vessels constructed wholly or partly of glass and containing salt or fresh water in which are kept living specimens of marine or fresh-

Aquarium

Aquarius

water animals along with aquatic plants. In principle the aquarium depends on the interdependence of animal and vegetable life; animals consuming oxygen and ex-



Aquarium

haling carbonic acid, plants reversing the process by absorbing carbonic acid and giving out oxygen. The aquarium must consequently be stocked both with plants and animals, and for the welfare of both something like a proper proportion should exist between them. The simplest form of aquarium is that of a glass vase; but aquariums on a larger scale consist of a tank or a number of tanks with plate-glass sides and stone floors, and contain sand and gravel, rocks, sea-weeds, etc. By improved arrangements light is admitted from above, passing through the water in the tanks and illuminating their contents, while the spectator is in comparative darkness. Aquariums on a large scale have been constructed in connection with public parks or gardens, and the name is also given to places of public entertainment in which large aquariums are exhibited.

Aquarius (a-kwā'ri-us), the Water-bearer; a sign in the zodiac which the sun enters about the 21st of January. Its symbol represents part of a stream of water, probably in allusion to the rains occurring at this season.

Aquatint (ak'wa-tint), a method of etching on copper by means of nitric acid, with an effect resembling a fine drawing in sepia or Indian ink. The special character of the effect is the result of sprinkling finely powdered resin or mastic over the plate, and causing this to adhere by heat, the design being previously etched, or being now traced out. The nitric acid (aqua fortis) acts only in the interstices between the particles of resin or mastic, thus giving a slightly granular appearance.

Aqua Tofana. See *Aqua*.

Aqua Vitæ See *Aqua*.

Aqueduct

Aquaviva (ä'kwä-vē'vā), CLAUDIUS (1543-1615), the fifth Jesuit general and one of the greatest.

Aqueduct (ak'wē-dukt; Lat. *aqua*, water, *duco*, to lead), an artificial channel or conduit for the conveyance of water from one place to another; more particularly applied to structures for conveying water from distant sources for the supply of large cities. Aqueducts may be below ground, on the surface, or raised on walls; it is to the last form of construction that the term is popularly applied. Aqueducts, mainly open canals, existed in Egypt, Babylonia and Assyria. Among the Phœnicians much engineering skill was displayed in the building of works for conveying water to the inhabitants of cities. The conduits that supplied Jerusalem are of great interest, and of high antiquity, going back probably to the times of the Kings of Judah. The Greeks, who perhaps derived their ideas in this connection from the Phœnicians, were the first in Europe to attempt to solve the problem of water supply. The works at Samos (625 B.C.) anticipated modern construction by the use of a tunnel over half a mile long through which water was led from its source to the masonry conduits of the city. Similar extensive works were carried out at Athens.

Aqueducts were extensively used by the Romans, and many of them still remain in different places on the Continent of Europe, some being still in use. The Pont du Gard in the south of France.



The Pont du Gard Aqueduct

14 m. from Nismes, is still nearly perfect, and is a grand monument of the Roman occupation of that country. The ancient aqueducts were constructed of stone or brick, sometimes tunneled through hills, and carried over valleys and rivers on arches. The Pont du Gard is built of great blocks of stone; its height is 160 feet; length of the highest arcade 882 ft. The aqueduct at Segovia, originally built by the Romans, has in some parts two

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tiers of arcades 100 feet high, is 2921 feet in length, and is one of the most admired works of antiquity. In Italy the Spoleto aqueduct, 60 miles N. E. of Rome, forms a link between the ancient Roman aqueducts and the structures of modern times. It dates from the 6th century, is 300 ft. high and about 700 feet long, and is used both as bridge and aqueduct. The Maintenon aqueduct in France was begun by Louis XIV, to carry the water of the Eure from Point Gouin to Versailles. It is said that 40,000 soldiers were employed on the work. It was never completed. In England the Manchester aqueduct was constructed to bring water from Longendale to Manchester. The system for conveying water from Lake Thirlmere to Cumberland, constructed 1885-94, extends nearly 100 miles, thus rivaling in length the most recent of modern structures. There are 13¾ miles in tunnels, 38 miles in shallow tunnels cut from the surface, and 44½ miles in siphon pipes of 40 in. diameter. The Birmingham water-supply has an aqueduct of 73 miles in length. The Glasgow aqueduct, to convey water from Loch Katrine to the city is 35 miles long. The Liverpool aqueduct to bring the water of the river Vyrnwy in Wales to Liverpool has a total length of 68 miles. Of modern Continental aqueducts one of the most notable is that of Vienna, 60 miles long, starting at the foot of the Styrian Alps, 1150 ft. above the level of the Danube at Vienna. The Bombay aqueduct, in British India, brings the water supply of the city from the river Tansa, 65 miles N. of Bombay. The latest projects in aqueduct building are the two immense structures lately completed in the extreme east and the extreme west of the United States. The Catskill aqueduct, constructed to afford the city of New York an increase in its water supply, is the most notable example of the tunnel type of aqueduct in the world. Through it the collected waters of sections of the Catskill Mountains, 100 miles distant, are delivered to the five boroughs of New York City. At the Ashokan Reservoir, 590 feet above sea level, the waters of Esopus Creek are impounded by dams and form a lake 12 miles long by 3 miles in width, which contains 130,000,000,000 gallons. The tunnel system which conveys this water to the city is of four types of construction: cut-and-cover, that is, a concrete tunnel built in an excavated trench and covered with rock or earth; grade tunnel, bored through mountains and hills, at the same level as the adjacent aqueduct; steel pipe siphon, used to cross narrow valleys where the rock is not sufficiently solid to permit a deep conduit; and pressure tunnel, for carrying the

aqueduct under the bed of large streams, lakes, etc. The cut-and-cover form was used wherever possible. There are about 55 miles of this, approximately horseshoe-shape in section, 17 feet 6 inches wide and 17 feet high inside. There are 24 grade tunnels, making up 14 miles of the length of the aqueduct. Their dimensions are 13 feet 4 inches by 17 feet high. The steel pipe siphon was used in several places where the rock was not solid enough to allow of tunneling. The pipes are ¾ inch thick, riveted, lined with concrete 2 inches thick, and are from 9 to 11 feet inside diameter. They are in three rows and are covered externally by a heavy layer of concrete. The pressure tunnels, of which there are seven, are driven through rock at great depth. They are 14 feet 6 inches in diameter, and are lined with concrete; they connect at each of their ends with a vertical shaft in the adjoining section of the aqueduct. The deepest of these is that under the Hudson, at a depth of 1100 feet below water level at mean tide. This tunnel is 3000 feet long. In all there are 17 miles of pressure tunnels. Kensico Reservoir, 30 miles from the city, is a storage basin of 40,000,000,000 gallons capacity, to be used in emergencies or interruption of flow from the Ashokan. The system of a length of 92 miles terminates at Hill View Reservoir, 15 miles farther south. By a continuation of the deep pressure system, 18 miles in length, from the city line at Yonkers to Brooklyn, the Catskill water is delivered to the city boroughs. The water flows by gravity all the way and rises under its own head to 265 feet in the city. It is calculated that the water supply will be increased by 250,000,000 gallons daily. The work was begun in 1906 and completed at a cost of \$375,000,000.

The Los Angeles aqueduct is in extent of ground covered even a more stupendous undertaking than the Catskill tunnels. It is designed to bring the waters from the Owens River Valley in the Sierra Nevada range, to the city of Los Angeles, a distance of 240 miles. The main features of construction are similar to the Catskill aqueduct, with rather more exposed construction and less tunneling in the Los Angeles system than in the Catskill. The aqueduct delivers 265,000,000 gallons of water to the city daily, and a further development of the system is planned to insure the generation of 120,000 horsepower electric energy. The work was commenced in 1908; completed in 1913.

Aqueous (a'kwe-use or a'kwe-us)
HUMOR, the limpid watery fluid which fills the space between the cornea and the crystalline lens in the eye.

Aqueous rocks, mechanically formed rocks, composed of matter deposited by water. Called also *sedimentary* or *stratified rocks*. See *Geology*.

Aquifoliaceæ (ak-wé-fol-i-a'-ce-è), an order of plants; the holly tribe. The species consist of trees and shrubs, and the order includes the common holly (*Ilex aquifolium*) and the *I. paraguariensis*, or Paraguayan tea tree.

Aquila (ak'wè-là), a town in Italy, capital of the province of Aquila, 55 miles northeast of Rome, the seat of a bishop, an attractive and interesting town with spacious streets and handsome palaces. It was twice sacked by the French armies in 1799. Population 18,494. The province has an area of 2509 sq. miles, a population of 397,645.

Aquila, a native of Pontus, flourished about 130 A.D., celebrated for his exceedingly close and accurate translation of the Hebrew Scriptures into Greek.

Aquilaria. See *Aloes-wood*.

Aquilegia, a genus of plants, popularly columbine. The garden plant has a flower resembling five clustered pigeons. Hence the name.

Aquileia (ak-wi-lè'a), an ancient city near the head of the Adriatic Sea, in Upper Italy, built by the Romans in 182 or 181 B.C. Commanding the N. E. entrance into Italy it became important as a commercial center and a military post, and was frequently the base of imperial campaigns. In 452 it was destroyed by Attila. The modern Aquileia or Aglar is a small place of about 2000 inhabitants. It belongs to Austria and is in the crownland of Görz.

Aquinas (a-kwí-nas; i.e., of Aquino), ST. THOMAS, a celebrated scholastic divine, born about 1227; died in 1274; descended from the counts of Aquino, in the Kingdom of the Two Sicilies. He was educated at the Benedictine monastery of Monte Cassino, and at the University of Naples, where he studied for six years. About the age of seventeen he entered a convent of Dominicans, much against the wishes of his family. He attended the lectures of Albertus Magnus

at Cologne, in whose company he visited Paris in 1245 or 1246. Here he became involved in the dispute between the university and the Begging Friars as to the liberty of teaching, advocating the rights claimed by the latter with great energy. In 1257 he received

the degree of doctor from the Sorbonne, and began to lecture on theology, rapidly acquiring the highest reputation. In 1263 he was at the Chapter of the Dominicans in London, and in 1268 in Italy, lecturing in Rome, Bologna, and elsewhere. In 1271 he was again in Paris lecturing to the students; in 1272 professor at Naples. He had been offered the archbishopric of Naples and the abbacy of Monte Cassino, but refused the offer. He died on his way to Lyons to attend a general council for the purpose of uniting the Greek and Latin Churches. He was called, after the fashion of the times, the *angelic doctor*, and was canonized by John XXII. The most important of his numerous works, which were all written in Latin, is the *Summa Theologiae*, which, although only professing to treat of theology, is in reality a complete and systematic summary of the knowledge of the time. His disciples were known as *Thomists*.

Aquitania (ak-wi-tà'ni-a), later AQUITAINE, a Roman province in Gaul, which comprehended the countries on the coast from the Garonne to the Pyrenees and from the sea to Toulouse. It was brought into connection with England by the marriage of Henry II with Eleanor, daughter of the last Duke of Aquitaine. The title to the province was long disputed by England and France, but it was finally secured by the latter (1453).

Arabah (à-rà-bà), a deep, rocky valley or depression in northwestern Arabia, between the Dead Sea and Gulf of Akabah, a sort of continuation of the Jordan valley.

Arabesque (ar'a-besk), a species of ornamentation for enriching flat surfaces, often consisting of fanciful figures, human or animal, combined with floral forms. There may be said to



Renaissance Arabesque.

be three periods and distinctive varieties of arabesque—(a) the Roman or Græco-Roman, introduced into Rome from the East when pure art was declining; (b) the Arabesque of the Moors as seen in the Alhambra, introduced by them into Europe in the middle ages; (c) Modern

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Arabesque, which took its rise in Italy in the Renaissance period of art. The arabesques of the Moors, which perhaps reached their highest expression in the Alhambra, consist essentially of complicated ornamental designs based on the suggestion of plant-growth, combined with extremely complex geometrical forms.

Arabgir (a-râb-gîr') or ARABKIR, a town in Asiatic Turkey 147 miles w. s. w. of Erzerum, noted for its manufactures of silk and cotton goods, Pop. 20,000.

Arabi Pasha (â-râ'bi pa-sha'), called by himself *al-Hisri*, 'the Egyptian,' was born in Lower Egypt in 1839 or 1840 of a fellah family. He entered the army as a conscript and was made an officer by Said Pasha in 1862. About 1875 he joined a secret society which had for its object the elimination of Turkish officers in the Egyptian army, but which soon began agitation against Europeans. In 1881 he headed a military revolt, and was for a time virtually dictator of Egypt. Attacked by a British army, and after a short campaign, beginning with the bombardment of Alexandria and ending with the defeat of Arabi and his army at Tell-el-Kebir, he surrendered and was banished to Ceylon. He returned to Egypt, 1901; died Sept., 1911.

Arabia (a-râ'bi-a), a great peninsula in the s.w. of Asia, bounded on the N. roughly by parallel 30° N., on the N.E. by the Persian Gulf and the Gulf of Oman, S. or S.E. by the Indian Ocean, and S.W. by the Red Sea and Gulf of Aden. Its length from N. to S.E. is about 1800 miles, its mean breadth about 300 miles, its area rather over 1,000,000 sq. m., its pop. probably not more than 3,500,000. Roughly described, it exhibits a central tableland surrounded by a series of deserts, with numerous scattered oases, while around this is a line of mountains parallel to and approaching the coasts, and with a narrow rim of low grounds (*tehâma*) between them and the sea. In its general features Arabia resembles the Sahara, of which it may be considered a continuation. Like the Sahara, it has its wastes of loose sand, its stretches of bare rocks and stones, its mountains devoid of vegetation, its oases with their wells and streams, their palm-groves and cultivated fields—*islands of green* amid the surrounding desolation. Rivers proper there are none. By the ancients the whole peninsula was broadly divided into three great sections—Arabia Petraea (containing the city Petra), Deserta (desert), and Felix (happy). The first and last of these answer roughly to the modern divisions of the region

Arabia

of Sinai in the N.W. and Yemen in the S.W. while the name *Deserta* was vaguely given to the rest of the country. The principal divisions at the present are the Sinai Peninsula in the extreme northwest, lying between the Gulf of Suez and the Gulf of Akabah; on the east and extending south is El Hedjaz (Hedjas the 'Barrier') fronting throughout its length on the Red Sea, comprising the sacred territory of Mecca and Medinah; this is succeeded by the fertile, well-watered and well-cultivated country of El Yemen, likewise on the Red Sea, the littoral from 20° N. to 15° N. being the low-lying sandy strip, covered with coral debris, of El Tehama; Hadramaut and Mahra fronting the Gulf of Aden and the Indian Ocean respectively are on the south; the mountainous kingdom of Oman, forming the horn of Arabia, lies on the Gulf of Oman to the East; El Hasa in the northeast, fronting the Persian Gulf; and El Nejd, the oasis-studded middle portion of the interior. The deserts are the stony Syrian Desert in the north, the Nefud (the Red Sand Desert) below it, and the great arid waste of Roba el Khali to the south. The chief towns are Mecca, the birthplace of Mohammed; Medina, the place to which he fled from Mecca (A.D. 622), and where he is buried; Mocha, a seaport celebrated for its coffee; Aden, on the S.W. coast, a strongly fortified garrison belonging to Britain; Sana, the capital of Yemen; and Muscat, the capital of Oman, a busy port with a safe anchorage. The chief towns of the interior are Hail, the residence of the emir of Northern Nejd; Oneizah, under the same ruler; and Riad, capital of Southern Nejd. The most flourishing portions of Arabia are in Oman, Hadramaut, and Nejd. In the two former are localities with numerous towns and villages and settled industrious populations like those of Hindustan or Europe.

The climate of Arabia in general is marked by extreme heat and dryness. Aridity and barrenness characterize both high and low grounds, and the date-palm is often the only representative of vegetable existence. There are districts which in the course of the year are hardly refreshed by a single shower of rain. Forests there are few or none. Grassy pastures have their place supplied by steppe-like tracts, which are covered for a short season with aromatic herbs, serving as food for the cattle. The date-palm furnishes the staple article of food; the cereals are wheat, barley, maize, and millet; various sorts of fruit flourish; coffee and many aromatic plants and substances, such as gum-arabic, benzoin, mastic, balsam, aloes, myrrh, frankin-

cense, etc., are produced. There are also cultivated in different parts of the peninsula, according to the soil and climate, beans, rice, lentils, tobacco, melons, saffron, colocynth, poppies, olives, etc. Sheep, goats, oxen, the horse, the camel, ass, and mule supply man's domestic and personal wants. Among wild animals are gazelles, ostriches, the lion, panther, hyena, jackal, etc. Among mineral products are saltpeter, mineral pitch, petroleum, salt, sulphur, and several precious stones, as the carnelian, agate, and onyx.

The Arabs, as a race, are of middle stature, of a powerful though slender build, and have a skin of a more or less brownish color; in towns and the uplands often almost white. Their features are well cut, the nose straight, the forehead high. They are naturally active, intelligent, and courteous; and their character is marked by temperance, bravery, and hospitality. The first religion of the Arabs, various forms of fetishism, was supplanted by the doctrines of Mohammedanism, which succeeded rapidly in establishing itself throughout Arabia. Besides the two principal sects of Islam, the Sunnites and the Shiites, there also exists, in considerable numbers, a third Mohammedan sect, the Wahabias, which arose in the latter half of the eighteenth century, and for a time possessed great political importance in the peninsula. The mode of life of the Arabs is either nomadic or settled. The nomadic tribes are termed Bedouins (or Bedouin), and among them are considered to be the Arabs of the purest blood. Commerce is largely in the hands of foreigners, among whom the Jews and Banians (Indian merchants) are the most numerous.

The history of the Arabs previous to Mohammed is obscure. The earliest inhabitants are believed to have been of the Semitic race. Jews in great numbers migrated into Arabia after the destruction of Jerusalem, and, making numerous proselytes, indirectly favored the introduction of the doctrines of Mohammed. With his advent the Arabians uprose and united for the purpose of extending the new creed; and under the caliphs—the successors of Mohammed—they attained great power, and founded large and powerful kingdoms in three continents. (See *Caliphs*.) On the fall of the caliphate of Bagdad in 1258 the decline set in, and on the expulsion of the Moors from Spain the foreign rule of the Arabs came to an end. In the sixteenth century Turkey subjected Hejaz and Yemen, and received the nominal submission of the tribes inhabiting the rest of Arabia. The subjection of Hejaz was maintained down to

the year 1917; but Yemen achieved its practical independence in the 17th century, and maintained it till 1872, when the territory again fell into the hands of the Turks. In 1839 Aden was occupied by the British. Oman early became virtually independent of the caliphs, and grew into a well-organized kingdom. In 1508 its capital, Maskat or Muscat, was occupied by the Portuguese, who were not driven out till 1651. The Wahabias appeared towards the end of the eighteenth century, and took an important part in the political affairs of Arabia, but their progress was interrupted by Mehemet Ali, pasha of Egypt, and they suffered a complete defeat by Ibrahim Pasha. He extended his power over most of the country, but the events of 1840 in Syria compelled him to renounce all claims to Arabia. As a result Hejaz was again subjected to the sway of Turkey, which has since regained its rule over Yemen and subjected El-Hasa. In 1917, during the European war, Hejaz declared its independence.

Arabian Language and Literature.—The Arabic language belongs to the Semitic dialects, among which it is distinguished for its richness, softness, and high degree of development. By the spread of Islam it became the sole written language and the prevailing speech in all Southwestern Asia and Eastern and Northern Africa, and for a time in southern Spain, in Malta, and in Sicily; and it is still used as a learned and sacred language wherever Islam is spread. Almost a third part of the Persian vocabulary consists of Arabic words, and there is the same proportion of Arabic in Turkish. The Arabic language is written in an alphabet of its own, which has also been adopted in writing Persian, Hindustani, Turkish, etc. As in all Semitic languages (except the Ethiopic), it is read from right to left. The vowels are usually omitted in Arabic manuscripts, only the consonants being written.

Poetry among the Arabs had a very early development, and before the time of Mohammed poetical contests were held and prizes awarded for the best pieces. The collection called the *Moallakât* contains seven pre-Mohammedan poems by as many authors. Many other poems belonging to the time before Mohammed, some of equal age with those of the *Moallakât*, are also preserved in collections. Mohammed gave a new direction to Arab literature. The rules of faith and life which he laid down were collected by Abu-Bekr, first caliph after his death, and published by Othman, the third caliph, and constitute the *Korân*—the Mohammedan Bible. The progress

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of the Arabs in literature, the arts and sciences, may be said to have begun with the government of the caliphs of the family of the Abbassides, A.D. 749, at Bagdad, several of whom, as Harun al Rashid and Al Mamun, were munificent patrons of learning; and their example was followed by the Omniades in Spain. In Spain were established numerous academies and schools, which were visited by students from other European countries; and important works were written on geography, history, philosophy, medicine, physics, mathematics, arithmetic, geometry, and astronomy. Most of the geography in the middle ages is the work of the Arabians, and their historians since the eighth century have been very numerous. The philosophy of the Arabians was of Greek origin, and derived principally from that of Aristotle. Numerous translations of the scientific works of Aristotle and other Greek philosophers were made principally by Christian scholars who resided as physicians at the courts of the caliphs. These were diligently studied in Bagdad, Damascus, and Cordova, and, being translated into Latin, became known in the west of Europe. Of their philosophical authors the most celebrated are Alfarabi (tenth century), Ibn Sina or Avicenna (died A.D. 1037), Alghazzali (died 1111), Ibn Roshd or Averroes (twelfth century), called by preëminence The Commentator, etc. In medicine they excelled all other nations in the middle ages, and they are commonly regarded as the earliest experimenters in chemistry. Their mathematics and astronomy were based on the works of Greek writers, but the former they enriched, simplified, and extended. It was by them that algebra (a name of Arabic origin) was introduced to the western peoples, and the Arabic numerals were similarly introduced. Astronomy they especially cultivated, for which famous schools and observatories were erected at Bagdad and Cordova. The *Almagest* of Ptolemy in an Arabic translation was early a text-book among them. Along with science poetry continued to be cultivated, but after the ninth or tenth centuries it grew more and more artificial. Among poets were Abu Nowas, Asmai, Abu Temmam, Motenabbi, Abul-As, Busiri, Abu Firas, and Hariri. Tales and romances in prose and verse were written. The tales of fairies, genii, enchanters, and sorcerers in particular, passed from the Arabians to the western nations, as in *The Thousand and One Nights*. Some of the books most widely read in the middle ages, such as *The Seven Wise Masters* and *the Fables of Pity* or *Bidpai*, found their way into

Europe through the instrumentality of the Arabs. At the present day Arabic literature is almost confined to the production of commentaries and scholia, discussions on points of dogma and jurisprudence, and grammatical works on the classical language. There are a few newspapers published in Arabic.

Arabian Architecture. See *Moorish Architecture*, *Saracenic Architecture*.

Arabian Gulf. See *Red Sea*.

Arabian Nights, OF THE THOUSAND AND ONE NIGHTS, a celebrated collection of Eastern tales, long current in the East, and supposed to have been derived by the Arabians from India, through the medium of Persia. They were first introduced into Europe in the beginning of the eighteenth century by means of the French translation of Antoine Galland. Galland's translation is far from accurate, and to remedy this fault E. W. Lane produced, in 1840, a new and correct translation. The story which connects the tales of *The Thousand and One Nights* is as follows:—The Sultan Shahriyar, exasperated by the faithlessness of his bride, made a law that every one of his future wives should be put to death the morning after marriage. At length one of them, Shahrazad, the generous daughter of the grand-vizier, succeeded in abolishing the cruel custom. By the charm of her stories the fair narrator induced the sultan to defer her execution every day till the dawn of another, by breaking off in the middle of an interesting tale which she had begun to relate. In the form we possess them these tales belong to a comparatively late period, though the exact date of their composition is not known. Lane, who published a translation of a number of the tales, with valuable notes, is of opinion that they took their present form some time between 1475 and 1525. Two complete English translations have recently been printed, giving many passages that previous translators had omitted on the score of morality or decency.

Arabian Sea, the part of the Indian Ocean between Arabia and India.

Arabic (ar'a-bik) FIGURES, the characters, 1, 2, 3, 4, 5, 6, 7, 8, 9, 0; of Hindu origin, introduced into Europe by the Moors. They did not come into general use till after the invention of printing.

Arabine (ar'a-bin), that portion of gum-arabic which is soluble in water. It is known by the name of

mucilage and is used in pharmacy in making cough mixtures and in calico printing to thicken colors and mordants.

Arable (ar'a-bl) LAND, land which is wholly or chiefly cultivated by the plow, as distinguished from grass-land, woodland, common pasture, and waste.

Aracacha, or **ARRACACHA** (ar-a-kä'-cha), a genus of umbelliferous plants of Southern and Central America. The root of *A. arracacha* is divided into several lobes, each of which is about the size of a large carrot. These are boiled like potatoes and largely eaten in South America.

Aracan, or **ARAKAN** (ar-a-kan'), the most northern division of Lower Burmah, on the Bay of Bengal; area, 18,540 sq. miles; pop. 762,102. Ceded to the English in 1826, as a result of the first Burmese war.

Aracari (ä-rä-sh'rë), native name of a genus of brilliant birds (*Pteroglossus*) closely allied to the toucans, but generally smaller; natives of the warm parts of S. America.

Aracati (ä-rä-kä-të'), a Brazilian river-port, prov. of Ceará, on the river Jaguaribe, about 10 miles from its mouth. Exports hides and cotton. Pop. about 12,000.

Araceæ (ä-rä'-ce-ë), a natural order of monocotyledonous plants, mostly tropical, having the genus *Arum* as the type. Most of the species have tuberous roots abounding in starch, which forms a wholesome food after the acrid (and even poisonous) juice has been washed out. See *Arum*, *Caladium*, *Dumb-son*.

Arachis (ar'a-kis), a genus of leguminous plants much cultivated in warm climates, and esteemed a valuable article of food. The most remarkable feature of the genus is that when the flower falls the stalk supporting the small, undeveloped fruit lengthens, and bending towards the ground pushes the fruit into the ground, when it begins to enlarge and ripen. The pod of *A. hypogæa* (popularly called ground, earth, or pea-nut) is of a pale yellow color, and contains two seeds the size of a hazel-nut, in flavor sweet as almonds, and yielding when pressed an excellent oil.

Arachnida (ä-rak'ni-da; Greek, *arachnê*, a spider), a class of Arthropoda or higher Annulose animals, including the Spiders, Scorpions, Mites, Ticks, etc. They have the body divided into a number of segments or *somites*, some of which have always articulated appendages (limbs, etc.). There is often a pair of nervous ganglia in each

somite, although in some forms (as spiders) the nervous system becomes modified and concentrated. They are oviparous and somewhat resemble insects but they have a united head and thorax and do not undergo a metamorphosis similar to insects. They respire by tracheæ, or by pulmonary sacs, or by the skin.

Arack, **ARRACK** (ar'ak), a spirituous liquor manufactured in the East Indies from a great variety of substances. It is often distilled from fermented rice, or it may be distilled from the juice of the cocoanut and other palms. Pure arrack is clear and transparent, with a yellowish or straw color, and a peculiar but agreeable taste and smell; it contains at least 52 to 54 per cent. of alcohol.

Arad (o'rod), a town of Hungary, on the Maros, 30 miles north of Temeswar, divided by the river into Old Arad and Uj (New) Arad, connected by a bridge; it has a fortress, and is an important railway center, with a large trade and manufactures. Pop. 70,000.

Aradus (ar'a-dus; now *Ruad*), an islet about a mile in circumference lying 2 miles off the Syrian coast, 35 miles N. of Tripoli; the site of the Phœnician stronghold Arvad, a city second only to Tyre and Sidon; now occupied by about 3000 people, mainly fishermen.

Ar'af, the purgatory of Islam, the place between heaven and hell. Its position is not strictly defined, but it is undoubtedly a place of purification by fire.

Arafat (ar-a-fat'), or **JEBEL ER RAHMEH** ('Mountain of Mercy'), a hill in Arabia, about 200 feet high, with stone steps reaching to the summit, 15 miles southeast of Mecca; one of the principal objects of pilgrimage among Mohammedans, who say that it was the place where Adam first received his wife Eve after they had been expelled from Paradise and separated from each other 120 years. A sermon delivered on the mount constitutes the main ceremony of the Hadj or pilgrimage to Mecca, and entitles the hearer to the name and privileges of a Hadji or pilgrim.

Arago (är'a-gö' or är-ä-gö'), **DOMINIQUE FRANÇOIS**, a French physicist, born in 1786; died at Paris in 1853. After studying in the Polytechnic School at Paris, he was appointed a secretary of the Bureau des Longitudes. In 1806 he was associated with Biot in completing in Spain the measurements of Delambre and Mechain to obtain an arc

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of the meridian. Before he got back to France he had been shipwrecked and narrowly escaped being enslaved at Algiers. In 1800 he was elected to the Academy of Sciences, and appointed a professor of the Polytechnic School. He distinguished himself by his researches in the polarization of light, galvanism, magnetism, astronomy, etc. His discovery of the magnetic properties of substances devoid of iron, made known to the Academy of Sciences in 1824, procured him the Copley medal of the Royal Society of London in 1825. A further consideration of the same subject led to the equally remarkable discovery of the production of magnetism by electricity. He took part in the revolution of 1848, and held the office of minister of war and marine in the provisional government. At the *coup d'état* of Dec., 1852, he refused to take the oath to the government of Louis Napoleon, but the oath was not pressed. His works, which were posthumously collected and published, consist, besides his *Astronomie Populaire*, chiefly of contributions to learned societies and biographical notices (*éloges*) of deceased members of the Academy of Sciences.

Arago, EMMANUEL, son of Dominique François, French advocate and politician, was born at Paris in 1812; called to the bar 1837; took part in the revolution of 1848; renounced politics after the *coup d'état* of Dec., 1852, but continued to practise at the bar. After the fall of the empire he again took a prominent part in public affairs, and held several important offices. He is author of a volume of poems and many theatrical pieces. Died 1896.

Arago, ETIENNE, brother of Dominique Arago, was born in 1802. He founded the journals *La Réforme* and *Le Figaro*; was director of the Théâtre du Vaudeville, 1829; took part in the revolution of 1848; was condemned to transportation, 1849; fled from France, but returned in 1859; was mayor of Paris during the German war, and appointed archivist to the Ecole des Beaux Arts, 1878. He is author of upwards of 100 dramas; *La Vie de Molière*; *Les Bleus et les Blancs*, and other works. He died March 6, 1892.

Aragon (ar'a-gon), KINGDOM OF, a former province or kingdom of Spain, now divided into the three provinces of Teruel, Huesca, and Saragossa; bounded on the N. by the Pyrenees, N. W. by Navarre, W. by Castile, S. by Valencia, and E. by Catalonia; length about 190 miles, average breadth 90 miles; area, 18,294 sq. miles. It was governed by its own monarchs until the

union with Castile on the marriage of Ferdinand and Isabella (1479). Pop. 912,711.

Aragona (a-rá-gó'ná), a town in Sicily, 8 miles N. N. E. of Girgenti. Pop. 11,985. In the neighborhood is the mud volcano of Macculuba.

Araguaya (á-rá-gwí'á), a Brazilian river, principal affluent of the Tocantins; rises about the 18th degree of S. lat.; in its course northwards forms the boundary between the provinces of Matto Grosso and Goyas, and falls into the Tocantins near lat. 6° S.; length, about 1300 miles, of which over one-half is navigable.

Aral, a salt-water lake in Asia, in Russian territory, about 150 miles W. of the Caspian Sea, between 43° 42' and 46° 44' N. lat., and 58° 18' and 61° 46' E. lon.; length 270 miles, breadth 165; area, 26,233 sq. miles (or not much smaller than Scotland). It stands 240 feet above the level of the Caspian, and 160 feet above the Mediterranean. It receives the Amoo Daria or Oxus and the Sir Daria or Jaxartes, and contains a multitude of sturgeon and other fish. It is encircled by rocky and sandy tracts, and its shores are without harbors. It has no outlet. The Aral contains a large number of small islands; steamers have been placed on it by the Russians.

Aralia (a-rá'lí-a), a genus of plants with small flowers arranged in umbels, and succulent berries, the type of the nat. order *Araliaceae*, which is nearly related to the *Umbelliferae*, but the species are of more shrubby habit. They are natives chiefly of tropical or sub-tropical countries, and in Britain are represented by the ivy; ginseng belongs to the order. From the pith of *Tetrapanax papyrifer* is obtained the so-called Chinese rice-paper.

Aram, EUGENE, a self-taught scholar whose unhappy fate has been made the subject of a ballad by Hood and a romance by Lord Lytton, was born in Yorkshire, 1704, executed for murder, 1759. In 1734 he set up a school at Knaresborough. About 1745 a resident of that place, named Daniel Clarke, was suddenly missing under suspicious circumstances; and no light was thrown on the matter till full thirteen years afterwards, when an expression dropped by one Richard Houseman respecting the discovery of a skeleton supposed to be Clarke's, caused him to be taken into custody. From his confession an order was issued for the apprehension of Aram, who had long quitted Yorkshire, and was at the time acting as usher at the grammar-school at Lynn. He was brought to trial on the 3d of August, 1759, at York,

where, notwithstanding an able and eloquent defense which he made before the court, he was convicted of the murder of Clarke, and sentenced to death. He was among the first to recognize the affinity of the Celtic to the other European languages, and under favorable circumstances might have done some valuable work in philological research.

Aramaic (ar-a-mā'ic) or **ARAMEAN**, a Semitic language nearly allied to the Hebrew and Phœnician, anciently spoken in Syria and Palestine and eastwards to the Euphrates and Tigris, being the official language of this region under the Persian domination. In Palestine it supplanted Hebrew, and it was it and not the latter that was the tongue of the Jews in the time of Christ. Parts of Daniel and Ezra are written in Aramaic, or, as this form of it is often incorrectly named, Chaldee, from an old notion that the Jews brought from Babylon. An important Aramaic dialect is the Syriac, in which there is an extensive Christian literature. See *Chaldee*, *Syriac*.

Araneidæ (a-ra-nē'i-dē), the spider family.

Aran Islands, or **SOUTH ISLANDS OF ARAN**, three islands at the mouth of Galway Bay, off the w. coast of Ireland. They are remarkable for a number of architectural remains of a very early date. The inhabitants are chiefly engaged in agriculture and fishing. The North Island of Aran lies off the coast of Donegal.

Aranjuez (ā-rān-hu-eth'), a small town and palace in Spain, 30 miles from Madrid, with splendid gardens laid out by Philip II. The court used to reside here from Easter till the close of June, and here occurred the outbreak of the revolution, 1808. Pop. 12,670.

Arany (o-ron'y), **JANOS**, Hungarian poet, born 1819, died 1882. He was for some time a strolling player, but became professor of Latin at the Normal School of Szalonta, professor of Hungarian literature at Nagy Körös, and secretary of the Hungarian Academy. Author of *The Lost Constitution*; *Katalin*; and a series of three connected narrative poems on the fortunes of Toldi, the Samson of Hungarian folk-lore; etc.

Arapahoes (a-rap'a-hōs), a tribe of American Indians located near the headwaters of the Arkansas and Platte rivers, not now of any importance.

Arapaima (a-ra-pi'ma), a genus of South American freshwater fishes, order Physostomi, family Osteoglossidæ, one species of which (*A. gigas*) grows to the length of 15 or 16

feet, and forms a valuable article of food in Brazil and Guiana. It is covered with large bony scales, and has a bare and bony head.

Ararat (ar'a-rat), a celebrated mountain in Armenia, forming the point of contact of Russia with Turkey and Persia; an isolated volcanic mass showing two separate cones known as the Great and Little Ararat, resting on a common base and separated by a deep intervening depression. The elevations are: Great Ararat, 16,916 feet; Little Ararat, 12,840 feet; the connecting ridge, 8,780 feet. Vegetation extends to 14,200 feet, which marks the snow-line. According to tradition, Mount Ararat was the resting-place of the ark when the waters of the flood abated.

Araroba, **ARRAROA** (a-ra-rō'ba), the powdered bark of *Andira araroba*. See *Andira*.

A'ras (the ancient *Araxes*), a river of Armenia, rising s. of Erzerum at the foot of the Bingol-dagh; it flows for some miles through Turkish territory, northeast to the new Russian frontier. Here it turns eastwards to the Erivan plain n. of Ararat, whence it sweeps in a semicircle mostly between the Russian and Persian territories round to its confluence with the Kur, 60 miles from its mouth in the Caspian; length, 500 miles.

Aratus (a-rā'tus), a Greek poet, born at Soli in Cilicia; flourished about 270 B.C. Wrote *Phænomena*, his most famous poem, and *Diosemeia* (of weather signs), which was translated by Cicero and Cæsar Germanicus, and imitated by Virgil in the Georgics. He is quoted by St. Paul in Acts, xvii:28.

Ara'tus, of SICYON, a statesman of ancient Greece, born 272 B.C. In 251 B.C. he overthrew the tyrant of Sicyon and joined it to the Achaean League, which he greatly extended. He accepted the aid of Antigonos Doson, King of Macedon, against the Spartans, and became in time little more than the adviser of the Macedonian king, who had now made the League dependent on himself. He is said to have been poisoned by Philip V of Macedon, 213 B.C.

Araucanians (ar-aw-kā'ni-ans), a South American native race in the southern part of Chile, occupying a territory stretching from about 37° to 40° of s. lat. They are warlike and more civilized than many of the native races of S. America, and maintained almost unceasing war with the Spaniards from 1537 to 1733, when their independence was recognized by Spain, though their territory was much curtailed.

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Araucaria

Their early contests with the Spaniards were celebrated in Ercilla's Spanish poem *Araucana*. With the republic of Chile they were long at feud, and latterly had at their head a French adventurer named Tounens, who claimed the title of king. In 1870 after prolonged resistance they finally submitted to Chile. The Chilean province of Arauco receives its name from them.

Araucaria (ar-aw-kā'ri-a), a genus of trees of the coniferous or pine order, belonging to the southern hemisphere. The species are large evergreen trees with rather large, stiff, flattened, and generally imbricated leaves, verticillate spreading branches, and bearing large cones, each scale having a single large seed. One of the best known species is *A. imbricata* (the Chile pine or monkey-puzzle), which is quite hardy. It is a native of the mountains of southern Chile, where it forms vast forests and yields a hard, durable wood. Its seeds are eaten when roasted. The Moreton Bay pine of N. S. Wales (*A. Cunninghamii*) supplies a valuable timber used in house and boat building, in making furniture, and in other carpenter work. A species, *A. excelsa*, or Norfolk Island pine, abounds in several of the South Sea Islands, where it attains a height of 220 feet with a circumference of 30 feet, and is described as one of the most beautiful of trees. Its foliage is light and graceful, and quite unlike that of *A. imbricata*, having nothing of its stiff formality. Its timber is of some value, being white, tough, and close-grained.

Arauco (a-ra-kō), a province of Chile, named from the Araucanian Indians; area, 2458 sq. miles; capital Lebu. Pop. 70,635.

Aravulli Hills (a-ra-vul'le), a range of Indian mountains running N. E. and S. W. across the Rajputana country, which they separate into two natural divisions—desert plains on the N. W. and fertile lands on the S. E.; highest point, Mount Abu (5653 feet).

Arawak (ār'a-wak), a tribe of Indians in Dutch Guiana, the name signifying 'meal eaters,' since their principal food is cassava bread. The name has been given to the great Arawakan linguistic stock, extending from southern Brazil and Bolivia to the northernmost part of the continent. It also spread over the West Indies, but was driven out by the irruption of the Caribs.

Araxes (a-raks'es). See *Aras*.

Arbaces (ar-bā'sēs), one of the generals of Sardanapalus, king of Assyria. He revolted and defeated

his master, and became the founder of the Median Empire in 846 B.C.

Arbalist (ar'ba-list), a crossbow.

Arbela (ar-bē'la; now *Erbil*), a place in the Turkish vilayet of Mosul, giving name to the decisive battle fought by Alexander the Great against Darius, at Gaugamela, about 20 miles distant from it, B.C. 331.

Arbitrage (ār'bi-trāzh), the same as *arbitration of exchanges*. See next article. **Arbitrageur** (ār'bi-trā-zheur) is one who makes calculations of currency exchanges.

Arbitration (ār'bi-trā'shun), is the hearing and determination of a cause between parties in controversy, by a person or persons chosen by the parties. This may be done by one person, but it is common to choose more than one. Frequently two are nominated, one by each party, with a third, the *umpire* (or, in Scotland, sometimes the *oversman*), who is called on to decide in case of the primary arbitrators differing. In such a case the umpire may be agreed upon either by the parties themselves or by the arbitrators, when they have received authority from the parties to the dispute to settle this point. The determination of arbitrators is called an *award*. It has the effect of a judgment, subject to appeal, which may be entered at any time within twenty days from the filing of such award. Arbitration in international affairs has many advocates for its adoption as a substitute for war, but so far questions of only secondary importance have been thus determined. The case of the privateer General Armstrong, in which the first Napoleon acted as arbitrator, was one of the first arbitration cases in American history. The Alabama claims, and more recently the Behring sea fisheries dispute, were settled in this way, and also the controversy between Britain and Venezuela in 1890.

Since this date a number of important questions have been submitted to and settled by The Hague Court of Arbitration (see the following article). One of the most important of these was the fishery dispute between the United States and Great Britain, settled amicably in 1910 after it had remained open for a century. In 1908 was instituted a *Central American Court of Justice* to deal with disputes between the States of that chronically disputatious country. Two such cases have been settled by this court, which promises to become of much utility.

Arbitration, INTERNATIONAL, THE PERMANENT COURT OF,

Arbitration

In 1898, at the request of Nicholas II, Emperor of Russia, a conference of representatives of the leading nations was held at The Hague, the capital of the Netherlands, for the purpose of taking steps in favor of maintaining general peace and reducing the armaments of the nations. Though it failed to produce the results hoped for, it led to the formation of a permanent court of international arbitration, before which several international disputes have since been amicably settled. At the suggestion of President Roosevelt a second Peace Congress was held at The Hague in 1907, at which 46 of the nations were represented. The principal achievement was the formation of an International Peace Court. The American delegates sought to bring about a system of obligatory arbitration and the establishment of a Permanent Court of Arbitral Justice. This court was established in principle, a large majority of the delegates favoring a permanent court of this character, but problems arose in the discussion which led to the subject being postponed until the next congress should meet at The Hague. The idea was to have an international court, with seventeen judges selected from the great jurists of the world, to sit at The Hague, meeting once or twice yearly, and ready to act without charge on any dispute between nations that might be brought before it. It would differ from the existing Court of Arbitration in the fact that the latter is called into session only when some case of importance is submitted to it for decision. Germany led the opposition to obligatory arbitration and succeeded in defeating it for the time, but the idea was reopened by President Taft in 1911, when he proposed a treaty with Great Britain in which all disputes between these nations, even those concerning questions of vital interest and national honor, should be arbitrated, where they could not be settled by diplomacy without resorting to arbitration. Arbitration treaties have become common since the recommendations of the Hague Peace Conference of 1907. The United States negotiated treaties with Great Britain, Spain, Norway, Sweden, Japan, Switzerland, Portugal and Italy, which went into effect in 1908 and were renewed in 1914.

Arbor Day, a day designated by legislative enactment, in the different States, for the voluntary planting of trees by the people; the pupils in the public schools now take part in the observance of the day. It was inaugurated in 1872 by the Nebraska State Board of Agriculture.

Arboretum (ar-bō-rē'tum; Lat. *arbor*, a tree), a place in which a collection of different trees and shrubs is cultivated for scientific or educational purposes.

Arboriculture (ar'bor-i-kul-tūr) includes the culture of trees and shrubs, as well as all that pertains to the preparation of the soil, the sowing of the seeds, and the treatment of the plants in their young state, the preparation of the land previous to their final transplantation, their just adaptation to soil and situation, their relative growth and progress to maturity, their management during growth, and the proper season and period for felling them.

Arbor vitæ (vī'tæ; lit. 'tree of life'), the name of several coniferous trees of the genus *Thuja*, allied to the cypress, with flattened branchlets, and small imbricated or scale-like leaves. The common Arbor Vitæ (*Thuja occidentalis*) is a native of North America, where it grows to the height of 40 or 50 feet. The young twigs have an agreeable balsamic smell. The Chinese Arbor Vitæ (*Thuja orientalis*), common in Britain, yields a resin which was formerly thought to have medicinal virtues.

Arbroath (ar-brōth'), or ABERBROTHOCK, an ancient industrial borough and seaport in the county of Forfar, Scotland, at the mouth of the small river Brothock. Its ancient abbey, founded by William the Lion in 1178, and dedicated to Saint Thomas à Becket, is now nothing but a picturesque ruin. There are numerous flax and hemp spinning-mills and factories, and much canvas and linen is made; also tanning, shoemaking, and fishing, and a small shipping trade, but the harbor is bad. Pop. 22,372.

Arbuthnot (ar'buth-not), JOHN, an eminent physician and distinguished wit, born at Arbuthnot, Kincardineshire, Scotland, 1667; died 1735. He received the degree of Doctor of Medicine at the University of St. Andrews; and went to London, where he soon distinguished himself by his writings and by his skill in his profession. In 1704 he was chosen fellow of the Royal Society, and soon after he was appointed physician to Queen Anne. About this time he became intimate with Swift, Pope, Gay, and other wits of the day. His writings, other than professional or scientific, include his contributions (in conjunction with Swift and Pope) to the *Memoirs of Martinus Scriblerus*, *History of John Bull*, *Art of Political Lying*, etc. He was conspicuous not only for learning and wit, but also for worth and humanity.

Arbutus

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Arbutus (är'bū-tus), a genus of plants belonging to the Ericaceæ, or heath order, and comprising a number of small trees and shrubs, natives chiefly of Europe and N. America. *Arbutus Unëdo* abounds near the lakes of Killarney, where its fine foliage adds charms to the scenery. The bright red or yellow berries, somewhat like the strawberry, have an unpleasant taste and narcotic properties. A kind of liquor is made from them. The trailing arbutus (är-bū'tus) or mayflower of N. America, a plant with fragrant and beautiful blossoms, is *Epigæa repens*, of the same natural order.

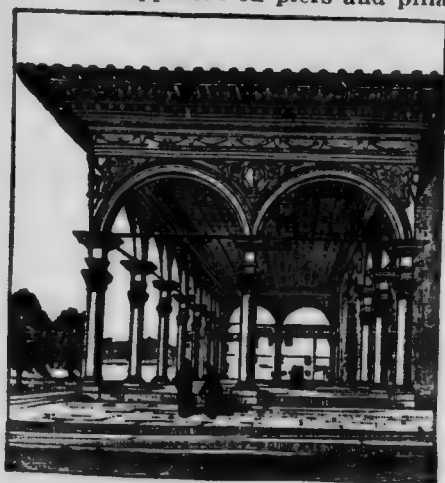
Arc, a portion of a curved line, especially of a circle. It is by means of circular arcs that all angles are measured. —*Electric or Voltaic arc*, the luminous arch of intense brightness and excessively high temperature which is formed by an electric current in crossing over the interval of space between the carbon points of an electric lamp. See *Arc-light*.

Arc, JEANNE D'. See *Joan of Arc*.

Arca (är'ka), a genus of bivalve molluscs, family *Arcidæ*, whose shells are known as *ark-shells*.

Arcachon (är-kä-shôn), a town of S. W. France, dep. Gironde, on the almost landlocked basin of Arcachon, a much-frequented bathing-place, with great oyster-rearing establishments. The town stretches along the shore, and is sheltered by sand-hills and pine-woods. It is connected by railway with Bordeaux. Pop. (1906) 9006.

Arcade (är-käd'), a series of arches supported on piers and pillars,

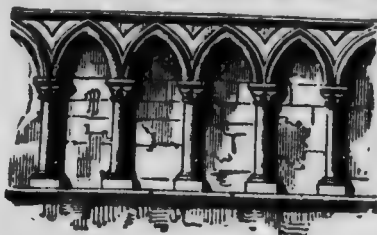


Arcade—Portico of S. Maria delle Grazie, near Arezzo.

used generally as a screen and support of a roof, or of the wall of a build-

Arcesilaus

ing, and having beneath the covered part an ambulatory, as around a cloister, or a foot-path with shops or dwellings, as frequently seen in old Italian



Arcade—Romsey Church, Hampshire.

towns. Sometimes a porch or other prominent part of an important building is treated with arcades, as in the illustration. At the present day Bologna, Padua, and Berne have fine examples of mediæval arcaded streets, and among more modern work various streets in Turin and the Rue de Rivoli, Paris, are lined with arcades, with shops underneath. In mediæval architecture the term arcade is also applied to a series of arches supported on pillars forming an ornamental dressing or enrichment of a wall, a mode of treatment of very frequent occurrence in the towers, apses, and other parts of churches. In modern use the name arcade is often applied to a passage or row street containing shops arched over and covered with glass, as for example the Burlington Arcade, London, and the Galleria Vittorio Emmanuele in Milan.

Arcadia (är-kä'di-a), the central and most mountainous portion of the Peloponnesus (Morea), the inhabitants of which in ancient times were celebrated for simplicity of character and manners. Their occupation was almost entirely pastoral, and thus the country came to be regarded as typical of rural simplicity and happiness. At the present day Arcadia forms a nomarchy of the Kingdom of Greece. Area, 2,028 sq. miles; pop. 167,092.

Arca'dius, born in 377, died 408; son of the Emperor Theodosius, on whose death, in 395 the empire was divided, he obtaining the East, and his brother Honorius the West. He proved a feeble and pusillanimous prince.

Arcanum (är-kä'num), a word used in the mediæval period to indicate the most valued preparations of alchemy. The 'Great Arcanum' was applied to the highest problems of the science, such as the discovery of the 'grand elixir' and other deep secrets of nature.

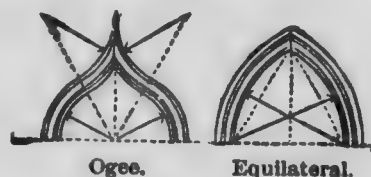
Arcesilaus (är-ses-i-lä'us), a Greek philosopher, the founder

of the second or middle academy, was born about 315 B.C., died 239 B.C. He left no writings, and of his opinions so little is known that it has been doubted whether he was a strict Platonist or a skeptic.

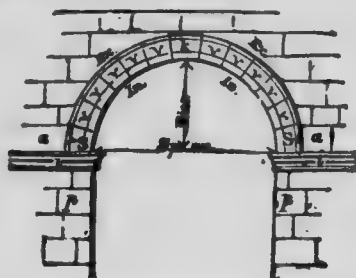
Arch, JOSEPH, labor reformer, born in Warwickshire, England, in 1826. Began life as a hedger; by hard study made himself a preacher of the Primitive Methodists; started a movement for the betterment of farm laborers; founded and became president of their National Union. Was elected to Parliament as a Liberal in 1885, and again in 1892 and 1895-1900.

Arch, a structure composed of separate pieces, such as stones or bricks, having the shape of truncated wedges, arranged on a curved line, so as to retain

ing points to the arch are called *piers* and *abutments*. The upper part of the pier or abutment where the arch rests—technically where it *springs from*—is the



impost. The *span* of an arch is in circular arches the length of its chord, and generally the width between the points of its opposite imposts whence it springs. The *rise* of an arch is the height of the highest point of its intrados above the line of the imposts; this point is sometimes called the *under side of the crown*, the highest point of the extrados



Parts of an Arch.

a, Abutments. f, Impost. p, Piers.
v, Voussoirs or arch-stones. k, Keystone.
s, Springers. in, Intrados. ex, Extrados.

their position by mutual pressure. The separate stones which compose the curve of an arch are called *voussoirs* or *arch-*

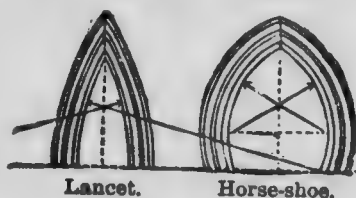
being the *crown*. Arches are designated in various ways, as from their shape (circular, elliptic, etc.), or from the resemblance of the whole contour of the curve to some familiar object (lancet arch, horse-shoe arch), or from the method used in describing the curve, as equilateral, three-centered, four-centered, ogee, and



Types of Arches.

Radiating arch.

Horizontal arch.



Lancet.

Horse-shoe.

stones; the extreme or lowest voussoirs are termed *springers*, and the uppermost or central one is called the *keystone*. The



Segmental.

Semicircular.

under or concave side of the voussoirs is called the *intrados*, and the upper or convex side the *extrados* of the arch. The supports which afford resting and resist-

the like; or from the style of architecture to which they belong, as Roman, pointed, and Saracenic arches.—*Triumphal arch*, originally a simple decorated arch under which a victorious Roman general and army passed in triumph. At a later period the triumphal arch was a richly sculptured, massive, and permanent structure, having an archway passing through it, with generally a smaller arch on either side. The name is sometimes given to an arch, generally of wood decorated with flowers or evergreens, erected on occasion of some public rejoicing, etc.

Archæan (ār-kē'an) ROCKS (Gr. *archaios*, ancient), the oldest rocks of the earth's crust, crystalline in character, and embracing granite,

Archæology

syenite, gneiss, mica-schist, etc., all devoid of fossil remains. These rocks underlie and are distinctly separate from the stratified and fossiliferous formations, which indeed have chiefly taken origin from them.

Archæology (är-ä-ol'ö-gi; Gr. *archaios*, ancient, and *logos*, a discourse), the science which takes cognizance of the history of nations and peoples as evinced by the remains, architectural, implemental, or otherwise, which belong to the earlier epoch of their existence. In a more extended sense the term embraces every branch of knowledge which bears on the origin, religion, laws, language, science, arts, and literature of ancient peoples. It is to a great extent synonymous with *prehistoric annals*, as a large if not the principal part of its field of study extends over those periods in the history of the human race in regard to which we possess almost no information derivable from written records. Archæology divides the primeval period of the human race, more especially as exhibited by remains found in Europe, into the *stone*, the *bronze*, and the *iron* age, these names being given in accordance with the materials employed for weapons, implements, etc., during the particular period. The *stone* age has been subdivided into the *palæolithic* and *neolithic*, the former being that older period in which the stone implements were not polished as they were in the latter and more recent period. The *bronze* age, which admits of a similar subdivision, is that in which implements were of copper or bronze. In this age the dead were burned and their ashes deposited in urns or stone chests, covered with conical mounds of earth or cairns of stones. Gold and amber ornaments appear in this age. The *iron* age is that in which implements, etc., of iron begin to appear, although stone and bronze implements are found along with them. The word *age* in this sense (as explained under *Age*) simply denotes the stage at which a people has arrived. The phrase *stone age*, therefore, merely marks the period before the use of bronze, the *bronze age* that before the employment of iron, among any specific people.

Archæopteryx (är-kä-op'te-riks), a unique fossil bird from the oolitic limestone of Solenhofen, of the size of a rook, and differing from all known birds in having two free claws representing the thumb and forefinger projecting from the wing, and about twenty tail vertebrae free and prolonged as in mammals.

Archangel (ärk-än'jel; Gr. prefix, *arch*, denoting chief), an

Archbishop

angel of superior or of the highest rank. The word archangel occurs in two passages in the Bible, 1 Thes. iv: 16 and Jude 9. The four archangels are Michael, Gabriel, Uriel and Raphael.

Archangel (ärk-än'jel), a seaport, capital of the Russian government of the same name, on the right bank of the northern Dwina, about 20 miles above its mouth in the White Sea. Below the town the river divides into several branches. There is a cathedral, hospital museum, etc. The houses are mostly of wood; the place has some manufactures and an important trade, exporting linseed, flax, tow, tallow, train-oil, mats, timber, pitch and tar, etc. The port is closed for six months by ice. Archangel, founded in 1584, was long the only port which Russia possessed. Pop. 20,933. The province has an area of 331,480 sq. miles; pop. 350,000.

Archbald (ärch'bäld), a post borough of Lackawanna Co., Pennsylvania, 10 miles N. E. of Scranton; has rich mines of anthracite in its vicinity. It has extensive coal breakers, also has silk mills. Pop. 9194.

Archbishop (ärch-bish'öp), a chief bishop or bishop over other bishops; a metropolitan prelate. The establishment of this dignity is to be traced up to an early period of Christianity, when the bishops and inferior clergy met in the capitals to deliberate on spiritual affairs, and the bishop of the city where the meeting was held presided. In England there are two (Protestant) archbishops—those of Canterbury and York; the former styled *Primate of all England*, the latter *Primate of England*. The Archbishop of Canterbury is the first peer of the realm, having precedence before all great officers of the crown and all dukes not of royal birth. He crowns the sovereign, and when he is invested with his archbishopric he is said to be enthroned. He can grant special licenses to marry at any time or place, and can confer all the degrees that may be obtained from the universities. He is addressed by the titles of *your grace* and *most reverend father in God*, and writes himself *by divine providence*, while the bishop only writes *by divine permission*. The first Archbishop of Canterbury was Augustine, appointed A.D. 598 by Ethelbert. Next in dignity is the Archbishop of York, between whom and the Archbishop of Canterbury the Lord High-chancellor of England has his place in precedence. The incomes of these two prelates are \$75,000 and \$50,000, respectively. Scotland had two archbishops—those of St. Andrews and Glasgow. Ireland had four—Dublin,

Archdeacon

Armagh, Tuam, and Cashel. In the United States there are fourteen (Roman Catholic) archdioceses.

Archdeacon (ärch-dē'kon), in England, an ecclesiastical dignitary next in rank below a bishop, who has jurisdiction either over a part of or over the whole diocese. He is usually appointed by the bishop, under whom he performs various duties, and he holds a court which decides cases subject to an appeal to the bishop.

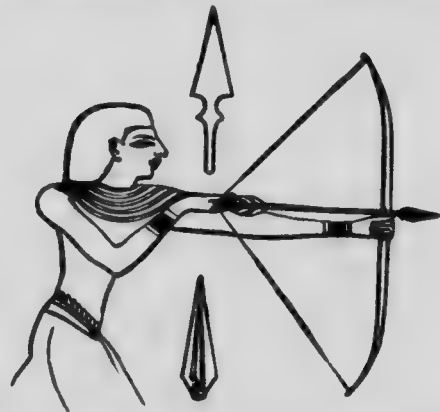
Archduke (ärch-duke'), a prince belonging to the reigning family of Austria.

Archelaus (är-kä-lä'us), the name of several personages in ancient history, one of whom was the son of Herod the Great. He received from Augustus the sovereignty of Judea, Samaria, and Idumea. The people tired

ians, Persians, Parthians, excelled in the use of the bow; and while the Greeks and Romans themselves made little use of it, they employed foreign archers as mercenaries. Coming to much more recent times, we find the Swiss famous as archers, but they generally used the arbalest or cross-bow, and were no match for their English rivals, who preferred the long-bow. (See *Bow*.) The English victories of Crécy, Poitiers, and Agincourt, gained against apparently overwhelming odds, may be ascribed to the bowmen. Archery disappeared gradually as firearms came into use, and as an instrument of war or the chase the bow is now confined to the most savage tribes of both hemispheres. But though the bow has long been abandoned among civilized nations as a military weapon, it is still cherished as an instrument of health-



Assyrian Archer.



Egyptian Archer with arrow-heads and stone-tipped reed arrow.

of his tyrannical and bloody reign, accused him before Augustus, who banished him to Gaul.

Archer-fish, a name given to the *Toxotes jaculator*, an acanthopterygian fish, family *Toxotidae*, inhabiting the East Indian and Polyneesian seas, which has the faculty of shooting drops of water to the distance of 3 or 4 feet at insects, thereby causing them to fall into the water, when it seizes and devours them. This power has been doubted or denied by several ichthyologists. The genus *Toxotes* is representative of the family. There are several species. Also called darter-fish.

Archery (ärch'e-ri), the art of shooting with a bow and arrow. The use of these weapons in war and the chase dates from the earliest antiquity. Ishmael, we learn from Gen., xxi, 'became an archer.' The Egyptians, Assy-

rian, Persians, Parthians, excelled in the use of the bow; and while the Greeks and Romans themselves made little use of it, they employed foreign archers as mercenaries. Coming to much more recent times, we find the Swiss famous as archers, but they generally used the arbalest or cross-bow, and were no match for their English rivals, who preferred the long-bow. (See *Bow*.) The English victories of Crécy, Poitiers, and Agincourt, gained against apparently overwhelming odds, may be ascribed to the bowmen. Archery disappeared gradually as firearms came into use, and as an instrument of war or the chase the bow is now confined to the most savage tribes of both hemispheres. But though the bow has long been abandoned among civilized nations as a military weapon, it is still cherished as an instrument of health-

Arches (ärch'es) COURT OF, the chief and most ancient consistory court, belonging to the archbishopric of Canterbury, for the debating of spiritual causes. It is named from the church in London, St. Mary le Bow, or Bow Church (so called from a fine arched steeple), where it was formerly held.

Archil

Archil, or **ORCHIL** (ár'kil, orkil), a red, violet, or purple coloring matter obtained from various kinds of lichens, the most important of which are the *Rocella tinctoria* and the *R. fuciformis*, natives of the rocks of the Canary and Cape de Verde islands, Mozambique and Zanzibar, South America, etc., and popularly called dyer's moss. The dye is used for improving the tints of other dyes, as from its want of permanence it cannot be employed alone; but the aniline colors have largely superseded it. Cudbear and litmus are of similar origin.

Archilochus (ár-kil'ó-kus), or **PAROS**, one of the earliest famous lyric poets, the first Greek poet who composed iambic verses according to fixed rules. He flourished about 700 B.C. His iambic poems were renowned for force of style, liveliness of metaphor, and a powerful but bitter spirit of satire. In other lyric poems of a higher character he was also considered as a model. All his works are lost but a few fragments.

Archimandrite (ár-ki-man'drit), in the Greek Church, an abbot or abbot-general, who has the superintendence of many abbots and monasteries.

Archimedean (á-rk-i-mē'dē-a-n), **SCREW**, a machine for raising water, said to have been invented by Archimedes. It is formed by winding a tube spirally round a cylinder so as to have the form of a screw, or by hollowing out the cylinder itself into a double or triple threaded screw and inclosing it in a water-tight case. When the screw is placed in an inclined position and the lower end immersed in water, by causing the screw to revolve the water may be raised to a limited extent.

Archimedes (ár-ki-mē'dēz), a celebrated ancient Greek physicist and geometrician, born at Syracuse, in Sicily, about 287 B.C. He enriched mathematics with discoveries of the highest importance, upon which the moderns have founded their admeasurements of curvilinear surfaces and solids. Archimedes is the only one among the ancients who has left us anything satisfactory on the theory of mechanics and on hydrostatics. He first taught the hydrostatic principle to which his name is attached, 'that a body immersed in a fluid loses as much in weight as the weight of an equal volume of the fluid, and determined by means of it, that an artist had fraudulently added too much alloy to a crown which King Hiero had ordered to be made of pure gold. He discovered the solution of this problem while bathing;

Architecture

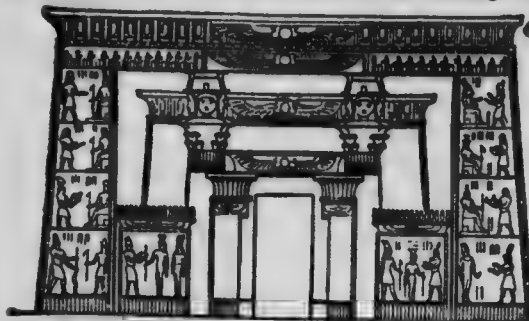
and it is said to have caused him so much joy that he hastened home from the bath undressed, and crying out, *Eureka!* *Eureka!* 'I have found it. I have found it!' Practical mechanics also received a great deal of attention from Archimedes, who boasted that if he had a fulcrum or standpoint he could move the world. He is the inventor of the compound pulley, probably of the endless screw, the Archimedean screw, etc. During the siege of Syracuse by the Romans he is said to have constructed many wonderful machines with which he repelled their attacks, and he is stated to have set on fire their fleet by burning-glasses! At the moment when the Romans gained possession of the city by assault (212 B.C.) tradition relates that Archimedes was slain by a soldier while he was sitting in the marketplace contemplating some mathematical figures which he had drawn in the sand.

Archipelago (ár-ki-pel'a-gō) a term originally applied to the *Ægean*, the sea lying between Greece and Asia Minor, then to the numerous islands situated therein, and latterly to any cluster of islands. In the Grecian Archipelago the islands nearest the European coast lie together almost in a circle, and for this reason are called the *Cyclades* (Gr. *kyklos*, a circle); those nearest the Asiatic, being farther from one another, the *Sporades* ('scattered'). (See these articles, and *Negropont*, *Scio*, *Samos*, *Rhodes*, *Cyprus*, etc.) The Malay, Indian, or Eastern Archipelago, on the east of Asia, includes Borneo, Sumatra, and other large islands. See *Malay Archipelago*.

Architecture (ár-ki-tect'ūr), in a general sense, is the art of designing and constructing houses, bridges, and other buildings for the purposes of civil life; or, in a more limited but very common sense, that branch of the fine arts which has for its object the production of edifices not only convenient for their special purpose, but characterized by unity, beauty, and often grandeur.—The first habitations of man were such as nature afforded, or cost little labor to the occupant—caves, huts, and tents. But as soon as men rose in civilization and formed settled societies they began to build more commodious and comfortable habitations. They bestowed more care on the materials, preparing bricks of clay or earth, which they at first dried in the air, but afterwards baked by fire; and subsequently they smoothed stones and joined them at first without, and subsequently with, mortar or cement. After they had learned to build houses,

they erected temples for their gods on a larger and more splendid scale than their own dwellings. The Egyptians are the most ancient nation known to us among

blocks of stone. In historic times the Greeks developed an architecture of noble simplicity and dignity. This style is of modern origin as compared with that of



Egyptian—Front of Temple of Isis, at Philae.

whom architecture had attained the character of a fine art. Other ancient peoples among whom it made great progress were the Babylonians, whose most celebrated buildings were temples, palaces, and hanging-gardens; the Assyrians, whose capital, Nineveh, was rich in splendid buildings; the Phœnicians, whose cities, Sidon, Tyre, etc., were adorned with equal magnificence; and the Israelites, whose temple was regarded as a wonder of architecture. But comparatively few architectural monuments of these nations have remained till our day.

This is not the case with the architecture of Egypt, however, of which we possess ample remains in the shape of pyramids, temples, sepulchres, obelisks, etc. Egyptian chronology is far from certain, but the greatest of the architectural monuments of the country, the pyramids of Ghizeh, are at least as old as 2800 or 2700 B.C., and may be much older. The Egyptian temples had walls of great thickness and sloping on the outside from bottom to top; the roofs were flat, and composed of blocks of stone reaching from one wall or column to another. The columns were numerous, close, and very stout, generally without bases, and exhibiting great variety in the designs of their capitals. The principle of the arch, though known, was not employed for architectural purposes. Statues of enormous size, sphinxes carved in stone, and on the walls sculptures in outline of deities and animals, with innumerable hieroglyphics, are the decorative objects which belong to this style.

The earliest architectural remains of Greece are of unknown antiquity, and consist of massive walls built of huge

decorating the column and its superimposed entablature. The Greeks had three orders, called respectively the *Doric*, *Ionic*, and *Corinthian*. (See articles under these names.) Greek buildings were abundantly adorned with sculptures, and painting was extensively used, the details of the structures being enriched by different colors or tints. Lowness of roofs and the absence of arches were distinctive features of Greek architecture, in which, as in that of Egypt, horizontality of line is another characteristic mark. The most remarkable public edifices of the Greeks were temples, of which the most famous is the Parthenon at Athens. Others exist in various parts of Greece as well as in Sicily, Southern Italy, Asia Minor, etc.,



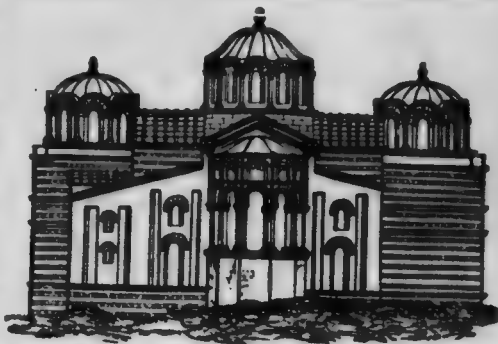
Grecian Doric—Temple of Jupiter, at Olympia.

where important Greek communities were early settled. Their theaters were semicircular on one side and square on the other, the semicircular part being usually

excavated in the side of some convenient hill. This part, the auditorium, was filled with concentric seats, and might be capable of containing 20,000 spectators. A number exist in Greece, Sicily, Asia Minor, and elsewhere. No remains of private houses are known to exist. By the end of the Peloponnesian War (say 400 B.C.) the best period of Greek architecture was over; a noble simplicity had given place to excess of ornament. After the death of Alexander the Great (323) the decline was still more marked.

Among the Romans there was no original development of architecture as among the Greeks, though they early took the foremost place in the construction of such works of utility as aqueducts and sewers, the arch being in early and extensive use among this people. As a fine art, however, Roman architecture had its origin in copies of the Greek models, all the Grecian orders being introduced into Rome, and variously modified. Their number, moreover, was augmented by the addition of two new orders—the *Tuscan* and the *Composite*. The Romans became acquainted with the architecture of the Greeks soon after 200 B.C., but it was not till about two centuries later that the architecture of Rome attained (under Augustus) its greatest perfection. Among the great works then erected were temples, aqueducts, amphitheaters, magnificent villas, triumphal arches, monumental pillars, etc. The *amphitheater* differed from the theater in being a completely circular or rather elliptical building, filled on all sides with ascending seats for spectators and leaving only the central space, called the *arena*, for the combatants and public shows. The Coliseum is a stupendous structure of this kind. The

residences are numerous, and the excavations at Pompeii in particular have thrown great light on the internal arrangements of the Roman dwelling-house.

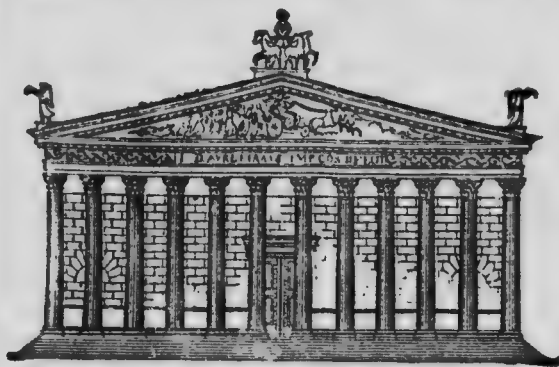


Byzantine—Church of our Lady, at Constantinople.

Almost all the successors of Augustus embellished Rome more or less, erected splendid palaces and temples, and adorned, like Hadrian, even the conquered countries with them. But after the period of Hadrian (117–138 A.D.) Roman architecture is considered to have been on the decline. The refined and noble style of the Greeks was neglected, and there was an attempt to embellish the beautiful more and more. This decline was all the more rapid later on from the disturbed state of the empire and the incursions of the barbarians.

In Constantinople, after its virtual separation from the Western Empire, arose a style of art and architecture which was practised by the Greek Church during the whole of the middle ages. This is called the Byzantine style. The church of St. Sophia at Constantinople, built by Justinian (reigned 527–565), offers the most typical specimen of the style, of which the fundamental principle was an application of the Roman arch, the dome being the most striking feature of the building. In the most typical examples the dome or cupola rests on four pendentives.

After the dismemberment of the Roman Empire the beautiful works of ancient architecture were largely destroyed by the Goths, Vandals, and other barbarians in Italy, Greece, Asia, Spain, and Africa; or what was spared by them was ruined by the fanaticism of the Christians. A new style of architecture now arose, two forms of which, the Lombard and the Norman Romanesque, form important phases of art. The Lombard prevailed in North

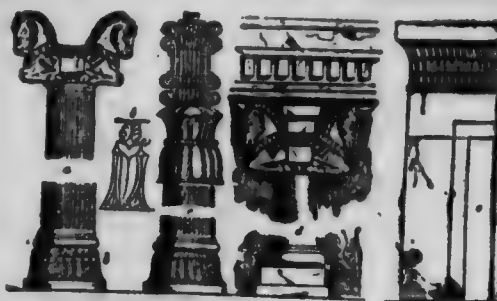


Roman Corinthian—Temple of the Sun, at Rome.

thermae, or baths, were vast structures in which multitudes of people could bathe at once. Magnificent tombs were often built by the wealthy. Remains of private

architecture now arose, two forms of which, the Lombard and the Norman Romanesque, form important phases of art. The Lombard prevailed in North

Italy and South Germany from the eighth or ninth to the thirteenth century (though the Lombard rule came to an end in 774); the Norman Romanesque



Details of Persian Architecture.

flourished, especially in Normandy and England, from the eleventh to the middle of the thirteenth century. The semi-circular arch is the most characteristic feature of this style. With the Lombard Romanesque were combined Byzantine features, and buildings in the pure Byzantine style were also erected in Italy, as the Church of St. Mark at Venice.

The conquests of the Moors introduced a fresh style of architecture into Europe after the eighth century—the Moorish or Saracenic. This style accompanied the spread of Mohammedanism after its rise in Arabia in the seventh century. The edifices erected by the Moors and Saracens in Spain, Egypt, and Turkey are distinguished, among other things, by a peculiar form of the arch, which forms a curve constituting more than half of a circle or ellipse. A peculiar flowery decoration, called *arabesque*, is a common ornament of this style, of which the building called the Alhambra (see *Alhambra*) is perhaps the chief glory.

The Germans were unacquainted with architecture until the time of Charlemagne (or Charles the Great, 742–814). He introduced into Germany the Byzantine and Romanesque styles. Afterwards the Moorish or Arabian style had some influence upon that of the western nations, and thus originated the mixed style which maintained itself till the middle of the thirteenth century. Then began the modern Gothic style, which grew up in France, England,

and Germany. Its striking characteristics are its pointed arches, its pinnacles and spires, its large buttresses, clustered pillars, vaulted roofs, profusion of ornament, and, on the whole, its lofty, bold character. Its most distinctive feature, as compared with the Greek or the Egyptian style, is the predominance in it of perpendicular or rising lines, producing forms that convey the idea of soaring or mounting upwards. Its greatest capabilities have been best displayed in ecclesiastical edifices. The Gothic style is divided into four principal epochs; the Early Pointed, or general style of the thirteenth century; the Decorated, or style of the fourteenth century; the Perpendicular, practised during the fifteenth and early part of the sixteenth centuries; and the Tudor, or general style of the sixteenth century. This style lasted in England up to the seventeenth century, being gradually displaced by that branch of the Renaissance or modified revival of ancient Roman architecture which is known as the *Elizabethan style*, and which is perhaps more purely an English style than any other that can be named.

The rise of the Renaissance style in Italy is the greatest event in the history of architecture after the introduction of the Gothic style. The Gothic style had been introduced into the country and extensively employed, but had never been thoroughly naturalized. The Renaissance is a revival of the classic style based on the study of the ancient models; and having practically commenced in Florence



Romanesque—Cathedral of Worms.

about the beginning of the fifteenth century, it soon spread with great rapidity over Italy and the greater part of Europe. The most illustrious architects of this early period of the style were

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Brunelleschi, who built at Florence the dome of the cathedral, the Pitti Palace, etc., besides many edifices at Milan, Pisa, Pesaro, and Mantua; Alberti, who wrote an important work on architecture, and erected many admired churches; Bramante, who began the building of St. Peter's, Rome, and Michael Angelo, who erected its magnificent dome. On St. Peter's were also employed Raphael, Peruzzi, and Sangallo. The noblest building in this style of architecture in Britain is St. Paul's, London, the work of Sir Christopher Wren.

Since the Renaissance period there has been no architectural development requiring special note. In edifices erected at the present day some one of the various styles of architecture is employed according to taste. Modern dwelling-houses have necessarily a style of their own so far as stories and apartments and windows and chimneys can give them one. In general the Grecian style, as handed down by Rome and modified by the Italian architects of the Renaissance, from its right angles and straight entablatures, is more convenient, and fits better with the distribution of our common edifices, than the pointed and irregular Gothic. But the occasional introduction of the Gothic outline and the partial employment of its ornaments has undoubtedly an agreeable effect both in public and private edifices; and we are indebted to it, among other things, for the spire, a structure exclusively Gothic, which, though often misplaced, has become an object of general approbation and a pleasing landmark to cities and villages. The works most characteristic of the present day are the grand bridges, viaducts, etc., in many of which iron is the sole or most characteristic portion of the material, and also the large and lofty mercantile buildings which are built upon a framework of steel columns and girders.

To compare the different countries in regard to their success in the field of modern architecture would be difficult, inasmuch as they have all produced architectural works worthy of their advances in material prosperity, education, and taste. Nor have the United States, Canada, and the Australian colonies shown themselves backward in following the lead of the older countries of Europe. In America the increase in the number of handsome buildings has been very noteworthy since the termination of the civil war.

A few words may be added on the architecture of India and China. Although many widely differing styles are to be found in India, the oldest and only

true native style of Indian ecclesiastical architecture is the Buddhist, the earliest specimens dating to 250 B.C. Among the chief objects of Buddhist art are *stupas* or *topes*, built in the form of large towers, and employed as *dagobas* to contain relics of Buddha or of some noted saint. Other works of Buddhist art are temples or monasteries excavated from the solid rock, and supported by pillars of the natural rock left in their places. Buddhist architecture is found in Ceylon, Thibet, Java, etc., as well as in India. The most remarkable Hindu or Brahmanical temples are in Southern India. They are pyramidal in form, rising in a series of stories. The Saracenic or Mohammedan architecture latterly introduced into India is of course of foreign origin. The Chinese have made the *tent* the elementary feature of their architecture; and of their style any one may form an idea by inspecting the figures which are depicted upon common chinaware. Chinese roofs are concave on the upper side, as if made of canvas instead of wood. (For further information on the different subjects pertaining to architecture see separate articles on the different styles—Greek, Roman, Gothic, etc.—and such entries as *Arch*, *Column*, *Aqueduct*, *Corinthian*, *Doric*, *Ionic*, *Theater*, etc.)

Architrave (ār'ki-trāv), in architecture, the part of an entablature which rests immediately on the heads of the columns, being the lowest of its three principal divisions, the others being the *frieze* and the *cornice*.

Archives (ār'kivz). See *Records*.

Archivolt (ār'ki-volt), in architecture, the ornamental band of mouldings on the face of an arch and following its contour.

Archons (ār'konz), the chief magistrates of ancient Athens, chosen to superintend civil and religious concerns. They were nine in number; the first was properly the *archon*, or *archōn epōnymos*, by whose name the year was distinguished in the public records; the second was called *archōn basileus*, or king archon, who exercised the functions of high-priest; the third, *polemarchos*, or general of the forces. The other six were called *thesmothētai*, or *legislators*.

Archytas (ār-kr'tas), an ancient Greek mathematician, statesman, and general, who flourished about 400 B.C., and belonged to Tarentum, in Southern Italy. The invention of the analytic method in mathematics is ascribed to him, as well as the solution of many geometrical and mechanical prob-

lema. He constructed various machines and automata, among the most celebrated of which was his flying pigeon. He was a Pythagorean in philosophy, and Plato and Aristotle are said to have been both deeply indebted to him. Only inconsiderable fragments of his works are extant.

Arcis-sur-Aube (är-ä-sür-öb), a small town of France, dep. Aube, at which, in 1814, was fought a battle between Napoleon and the allies, after which the latter marched to Paris. Pop. (1906) 2803.

Arc-light, that species of the electric light in which the illuminating source is a current of electricity passing between two sticks of carbon kept a short distance apart, one of them being in connection with the positive, the other with the negative terminal of a battery or dynamo. A brilliant glow of light fills the space between the carbon poles.

Arco (är-kö), a town of Tirol, near Lake Garda, a favorite winter resort for invalids. Pop. about 4,000.

Arcole (är-ko-lä), a village in North Italy, 15 miles S. E. of Verona, celebrated for the battles of Nov. 15, 16, and 17, 1796, fought between the French under Bonaparte and the Austrians, in which the latter were defeated with great slaughter.

Arcos de la Frontera (är'-kos dë lä fron-tä'-rä), a city of Spain, 30 miles E. by N. from Cadiz, on the Guadalete, here crossed by a stone bridge, on a sandstone rock 570 feet above the level of the river. On the highest part of the rock stands the castle of the dukes of Arcos, partly in ruins. The principal manufactures are leather, hats, and cordage. Pop. 13,928.

Arcot (är-kot'), two districts and a small town of India, within the Presidency of Madras. NORTH ARCOT is an inland district with an area of 7,256 sq. m. The country is partly flat and partly mountainous, where intersected by the Eastern Ghäts.—SOUTH ARCOT lies on the Bay of Bengal, and has two seaports, Cuddalore and Porto Novo. Pop. about 4,500,000.—The town of ARCOT is in North ARCOT, on the Palar, about 70 miles W. by S. of Madras, a former military cantonment; now abandoned as such. The town contains handsome mosques, a nabob's palace in ruins, and the remains of an extensive fort. Arcot played an important part in the wars which resulted in the ascendancy of the British in India. It was taken by Clive, 31st August, 1751, and heroically defended by him against an apparently over-

whelming force under Chanda Sahib. Pop. about 12,000.

Arctic (är-ä'tik), an epithet given to the north pole from the proximity of the constellation of the Bear, in Greek called *arktos*. The **Arctic Circle** is an imaginary circle on the globe, parallel to the equator, and 23° 28' distant from the north pole. This and its opposite, the **Antarctic**, are called the two polar circles.

Arctic Expeditions. See North Polar Expeditions.

Arctic Ocean, that part of the water surface of the earth which surrounds the north pole, and washes the northern shores of Europe, Asia, and America; its southern boundary roughly coinciding with the Arctic Circle (lat. 36° 32' N.). It incloses many large islands, and contains large bays and gulfs which deeply indent the northern shores of the three continents. Its great characteristic is ice, which is nearly constant everywhere, though many parts of it are navigable in the brief summer season.

Arctic Regions, the regions round the north pole, and extending from the pole on all sides to the Arctic Circle in lat. 66° 32' N. The Arctic or North Polar Circle just touches the northern headlines of Iceland, cuts off the southern and narrowest portion of Greenland, crosses Fox Strait north of Hudson Bay, whence it goes over the American continent to Bering Strait. Thence it runs to Obdorsk at the mouth of the Obi, then crossing northern Russia, the White Sea, and the Scandinavian Peninsula, returns to Iceland. It was long held as probable that the north pole was surrounded by an open sea. The sea is there, but it proves to be a frozen one, the Arctic Ocean having been widely investigated and the north pole reached in 1909 by a sledge journey across the ice. Valuable minerals, fossils, etc., have been discovered within the Arctic regions. In the archipelago north of the American continent excellent coal frequently occurs. The mineral cryolite is mined in Greenland. Fossil ivory (the tusks of the mammoth, *Elephas primigenius*) is obtained in islands at the mouth of the Lena. In Scandinavia, parts of Siberia, and northwest America, the forest region extends within the Arctic Circle. The most characteristic of the natives of the Arctic regions are the Eskimos. The most notable animals are the white or polar bear, the musk-ox, the reindeer, and the whalebone whale. Fur-bearing animals are numerous. The most intense cold ever

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registered in those regions was 74° below zero Fahr. The aurora borealis is a brilliant phenomenon of Arctic nights. See *North Polar Expeditions*.

Arctium (ark'-ti-um). See *Burdock*.

Arctomys (Ark'-o-mis). See *Marmot*.

Arcturus (Ark-tū'-rus), a fixed star of the first magnitude in the constellation of Boötes. It is so called because it is situated near the tail of the Bear, its name signifying guardian of the bear. It is seen in the northern heavens.

Ardahan (ār-dā-hān'), a small fortified town about 6400 feet above the sea, between Kars and Batūm, in Russian Armenia. It was captured by the Russians in 1877, and ceded to them by the Berlin treaty, 1878.

Ardea (ār-de-a), the genus to which the heron belongs, type of the family *Ardeidae*, which includes also the cranes, storks, bitterns, etc.

Ardebil, or ARDABIL (ār-de-bēl') a Persian town, province of Azerbaijan, near the Kara Su, a tributary of the Aras, about 40 m. from the Caspian, in an elevated and healthy situation; it has mineral springs and a considerable trade. Pop. about 16,000.

Ardèche (ār-dāsh'), a dep. in the south of France (Langue-doc), on the west side of the Rhone, taking its name from the river Ardèche, which rises within it, and falls into the Rhone after a course of 46 miles; area, 2134 sq. miles. It is generally of a mountainous character, and contains the culminating point of the Cevennes. Silk and wine are produced. Annonay is the principal town, but Privas is the capital. Pop. (1906) 347,140.

Ardennes (ār-den'), an extensive tract of hilly land stretching over a large portion of the northeast of France and southwest of Belgium. Anciently the whole tract formed one immense forest (*Arduenna Silva* of Cæsar); but though extensive districts are still under wood, large portions are now occupied by cultivated fields and populous towns.

Ardennes (ār-den'), a frontier department in the northeast of France; area, 2028 sq. miles, partly consisting of the Forest of Ardennes. There are extensive slate-quarries, numerous ironworks, and important manufactures of cloth, ironware, leather, glass, earthenware, etc. Chief towns, Mézières (the capital) and Sedan. Pop. 317,505.

Ardmore (ārd'mōr), a town of Oklahoma, in the Chickasaw section of the former Indian Territory.

Has coal, asphalt and zinc mines and productive oil wells; also products of glass, sand and asphalt paints. Pop. 10,500.

Ardnamurchan (ār-na-mu r'k a n) POINT, the most westerly point of the island of Great Britain, in Argyllshire, having a lighthouse, 180 feet above sea-level.

Ardoch (ār'dok), a parish in South Perthshire, celebrated for its Roman remains, one a camp, being the most perfect existing in Scotland.

Ardrossan (ār-drow'san), a seaport of Scotland, in Ayrshire, on the Firth of Clyde, with a good and spacious harbor, from which coal and iron are extensively exported. Pop. 5,933.

Are (ār), the unit of the French land measure, equal to 100 square meters, or 1,076.44 square feet. A hectare is 100 ares, equal to 2.47 acres.

Area (ā're-a), the superficial content of any figure or space, the quantity of surface it contains in terms of any unit.

Areca (a-rē'ka), a genus of lofty palms with pinnated leaves and a drupe-like fruit enclosed in a fibrous rind. *A. Catechu* of the Coromandel and Malabar coasts is the common areca palm which yields areca or betel nuts, and also the astringent juice catechu. *A. oleracea* is the cabbage-tree or cabbage-palm of the West Indies. With lime and the leaves of the betel-pepper, the areca-nuts when green form the celebrated masticatory of the East. They are an important article in Eastern trade.

Arecibo (ā-re-thē'bō), a seaport town on the north coast of the island of Porto Rico. Pop. (1910) 9612.

Areiopagus. See *Areopagus*.

Arena (a-rē'na), the enclosed space in the central part of the Roman amphitheaters, in which took place the combats of gladiators or wild beasts. It was usually covered with sand or sawdust to prevent the gladiators from slipping and to absorb the blood.

Arendal (ār'en-dāl), a seaport of Southern Norway, exporting quantities of timber and iron and owning numerous ships. Pop. 11,130.

Arenicola (ār-en-ik'o-la). See *Loose worm*.

Areolar (a-rē'-ō-lar) TISSUE, an assemblage of fibers and laminae pervading every part of the animal structure, and connected with each other so as to form innumerable small cavities, by means of which the various organs and parts of organs are connected together; called also *Cellular Tissue* and *Connective Tissue*.—In botany the term is sometimes

applied to the non-vascular substance, composed entirely of untransformed cells, which forms the soft substance of plants.

Areometer (ā-rē-om'e-tēr; from Greek *araios*, thin, *metron*, a measure), an instrument for measuring the specific gravity of liquids; a *hydrometer* (q. v.).

Areopagus (ā-ē-op'a-gus), the oldest of the Athenian courts of justice. It obtained its name from its place of meeting, on the Hill of Ares (Mars), near the citadel. It existed from very remote times, and the crimes tried before it were wilful murder, poisoning, robbery, arson, dissoluteness of morals, and innovations in the state and in religion. Its meetings were held in the open air, and its members were selected from those who had held the office of archon.

It is on a lesser hill, separated from the Acropolis by a very short saddle, so that it looks like a kind of outpost or spur sent out from the rock of the Acropolis. There are marks of old stairways cut in the rock, and to the right and left of the stairs are deep caverns, once the home of the Eumenides. On the flat top are still some signs of a rude smoothing of the stone for seats. Underneath is the site of the old *agora*, once surrounded with colonnades, the crowded market-place of those who sold and bought and bargained. Near the base of the hill, not much higher than the market-place, there is a semi-circular platform backed by the rising rock. This was probably the old *orchestra*, possibly the site of the oldest theatre. It was doubtless here, just above the thoroughfare of the *agora*, that booksellers kept their stalls. It was on the Areopagus that the Apostle Paul made his great defense of Christianity against the Athenians who worshipped 'an Unknown God.' It is probable that he spoke from the lower platform, but some declare that he was taken to the top of Mars Hill and delivered his speech before the court of the Areopagus. According to Athenian legend it was to this court that Orestes was brought, accused of the murder of his mother, Clytemnestra, and pleaded his cause before Athena herself. He was acquitted on a tie vote, and the Furies were appeased by the establishment of their worship as the Eumenides at Athens.

Arequipa (ā-rā-kē'pā), a city of Peru, 200 miles south of Cuzco, situated in a fertile valley, 7850 feet above sea level. Before the earthquake of 1868, which almost totally destroyed it, it was one of the best-built towns of South America. Behind the city rises the volcano of Arequipa, or Peak of Misté (20,328 feet). A considerable trade

is carried on through Mollendo, which has superseded Islay as the port of Arequipa, and is connected with it by railway. Pop. about 35,000.

Ares (ā'rēs). See *Mars*.

Arethusa (ār-e-thū'sa), in Greek mythology, a daughter of Nereus and Doris, a nymph, changed by Artēmis into a fountain in order to free her from the pursuit of the river-god Alpheus.

Aretino (ā-rā-tē'nō), Guido. See *Guido*.

Aretino, PIETRO, Italian poet, born at Arezzo, 1492, died at Venice, 1557; the natural son of a nobleman called Luigi Bacci. He early displayed a talent for satirical poetry, and when still a young man was banished from Arezzo on account of a sonnet against indulgences. He went to Perugia, and thence to Rome (1517), where he secured the papal patronage, but subsequently lost it through writing licentious sonnets. Through the influence of the Medici family he found an opportunity to insinuate himself into the favor of Francis I. In 1527 Aretino went to Venice, where he acquired powerful friends, among them the Bishop of Vicenza. By his devotional writings he regained the favor of the Roman court. The obscenity of some of his writings was such that his name has become proverbial for licentiousness.

Arezzo (ā-ret'sō, anc. *Arretium*), a city of Central Italy, capital of a province of the same name in Tuscany, near the confluence of the Chiana with the Arno. It has a noble cathedral, containing some fine pictures and monuments; remains of an ancient amphitheatre, etc. It was one of the twelve chief Etruscan towns, and in later times fought long against the Florentines, to whom it had finally to succumb. It is the birthplace of Mæcenas, Petrarch, Pietro Aretino, Redi, and Vasari. Pop. 16,780.—The province of Arezzo contains 1276 square miles and 275,588 inhabitants.

Argal, ARGOL, or TARTAR, a hard crust formed on the sides of vessels in which wine has been kept, red or white, according to the color of the wine. It is an impure bitartrate of potassium, and is of considerable use among dyers as a mordant. When purified it forms cream of tartar (q. v.).

Argala (ār'ga-la). See *Adjutant-bird*.

Argali (ār'ga-li), a species of wild sheep (*Caprovis Argali* or *Ovis ammon*) found on the mountains of Siberia, Central Asia, and Kamchatka. It is 4 feet high at the shoulders, and proportionately stout in its

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build, with horns nearly 4 feet in length measured along the curve, and at their base about 19 inches in circumference. It lives in small herds.

Argall, SIR SAMUEL, one of the early English adventurers to Virginia, born about 1572; died 1628. He planned and executed the abduction of Pocahontas, the daughter of the Indian chief Powhatan, in order to secure the ransom of English prisoners. He was deputy-governor of Virginia (1617-1619), and was accused of many acts of rapacity and tyranny. In 1620 he served in an expedition against Algiers, and was knighted by James I.

Argan (är'gan), a low, spiny evergreen tree of the natural order *Sapotaceæ*, found in southern Morocco. It bears an ovate drupe about the size of a plum, with white, milky juice. The Moors extract from this fruit an oil which they use with their food.

Argand Lamp (är'gand), a lamp named after its inventor, Aimé Argand, a Swiss chemist and physician (born 1755; died 1803), the distinctive feature of which is a burner forming a ring or hollow cylinder covered by a chimney, so that the flame receives a current of air both on the inside and on the outside.

Argao, a town in the Philippine Islands. Pop. 35,448.

Argaum (är-gä'um), a village of India, in Berar, celebrated for the victory of General Wellesley (Duke of Wellington) over the Mahrattas under Scindia and the Rajah of Berar, 28th November, 1803.

Argei (är-gē'i), a name given by the ancient Romans to a number of rush puppets (24 to 30) resembling men tied hand and foot, which were taken to the bridge over the Tiber by the pontifices, with the flaminica dialis in mourning guise, and thrown into the Tiber by the vestal virgins. No historical explanation of these curious rites exists.

Argelander (är'ge-län-dér), FRIEDRICH WILHELM AUGUST, an eminent German astronomer, born at Memel, 1799; died 1875; director successively of the observatories of Abo and of Helsingfors; appointed professor of astronomy at Bonn, 1837, where he superintended the erection of a new observatory, catalogued over 320,000 stars, and produced several important astronomical works.

Argemone (är-jem'o-nē), a small genus of ornamental American plants of the poppy order. From the seeds of *A. Mexicana* is obtained an oil very useful to painters. The handsomest species is *A. grandiflora*,

which has large flowers of a pure white color.

Argens, JEAN BATISTE DE BOYER, MARQUIS D' (1704-1771), French man of letters, author of *Lettres juives*.

Argensola (är-hen-sō'lā), LUPERCIO and BARTOLOMÉ LEONARDO DE, brothers, the 'Horaces of Spain,' born at Barbastro, in Aragon, the former in 1559; died in 1613; the latter born in 1562; died in 1631. Lupericio produced tragedies and lyric poems; Bartolomé a number of poems and a history of the *Conquest of the Moluccas*. Their writings are singularly alike in character, and are reckoned among the Spanish classics.

Argenson (är-zhän-sōn), MARC PIERRE DE VOYER, COMTE D', celebrated French statesman, born in 1696; died in 1764. After holding a number of subordinate offices he became, in 1743, secretary of state for war. After the peace in 1748 he reorganized the army on the Prussian model. He was present at the battle of Fontenoy, and was exiled to his estate for some years through the machinations of Madame Pompadour.

Argent (är'jent), in coats of arms, the heraldic term expressing silver: represented in engraving by a plain white surface.

Argenta (är-jen'ta), a city of Pulaski Co., Arkansas, on the N. bank of the Arkansas River, opposite Little Rock. It has railroad machine shops and other industries, and is a trading center. Pop. 11,138.

Argentan (är-zhän-tän), a French town, dep. of Orne (Normandy), with an old castle and some manufactures. Pop. (1906) 5072.

Argenteuil (är-zhän-teuyé), a town in France, dep. Seine-et-Oise, 7 miles below Paris; has an active trade in wine, fruit, and vegetables. Pop. (1911) 24,282.

Argentiera (är-jen-ti-ä'ra), or KIMÖLI (ancient *Cimolus*), an island in the Grecian archipelago, one of the Cyclades, about 18 miles in circumference, rocky and sterile. Produces a detergent chalk called *Cimolian earth*, used in washing and bleaching.

Argentine (är'jen-tēn), a silvery-white slaty variety of calcespar, containing a little silica with laminae usually undulated. It is found in primitive rocks and frequently in metallic veins.—Argentine is also the name of a small European fish (*Scopelus borealis*) of a silvery color.

Argentine (är'jen-tin) REPUBLIC, formerly called the United Provinces of La Plata, now

Argentina

Argentina

popularly known as Argentina, a vast country of South America, the extreme length of which is 2,400 miles, and the average breadth a little over 700 miles. the total area comprising 1,113,850 sq. miles. It is bounded on the N. by Bolivia; on the E. by Paraguay, Brazil, Uruguay, and the Atlantic; on the S., by the Antarctic Ocean; and on the W. by the Andes. It comprises four great natural divisions: (1) the Andine region, containing the provinces of Mendoza, San Juan, Rioja, Catamarca, Tucuman, Salta, and Jujuy; (2) the Pampas, containing the provinces of Santiago, Santa Fé, Cordova, San Luis, and Buenos Ayres; with the territories Formosa, Pampa, and Chaco; (3) the Argentine Mesopotamia, between the rivers Paraná and Uruguay, containing the provinces of Entre Rios and Corrientes, and the territory Misiones; (4) Patagonia, including the eastern half of Tierra del Fuego. With the exception of the N. W., where lateral branches of the Andes run into the plain for 150 or 200 miles, and the province of Entre Rios, which is hilly, the characteristic feature of the country is the great monotonous and level plains called 'pampas.' In the north these plains are partly forest-covered, but all the central and southern parts present vast treeless tracts, which afford pasture to immense herds of horses, oxen, and sheep, and are varied in some places by brackish swamps, in others by salt steppes. The great water-course of the country is the Paraná, having a length of fully 2,000 miles from its source in the mountains of Goyaz, Brazil, to its junction with the Uruguay, where begins the estuary of La Plata. The Paraná is formed by the union of the Upper Paraná and Paraguay rivers, near the N. E. corner of the State. Important tributaries are the Pilcomayo, the Vermejo, and the Salado. The Paraná, Paraguay, and Uruguay are valuable for internal navigation. Many of the streams which tend eastward terminate in marshes and salt lakes, some of which are rather extensive. Not connected with the La Plata system are the Colorado and the Rio Negro, forming the northern boundary of Patagonia. The source of the Negro is Lake Nahuel Huapi, in Patagonia (area, 1,200 sq. miles), in the midst of magnificent scenery. The level portions of the country are mostly of tertiary formation, and the river and coast regions consist mainly of alluvial soil of great fertility. In the pampas clay have been found the fossil remains of extinct mammalia, some of them of colossal size.

European grains and fruits, including the vine, have been successfully introduced, and are cultivated to some extent in most parts of the republic, but the great wealth of the State lies in its countless herds of cattle and horses and flocks of sheep, which are pastured on the pampas, and which multiply there very rapidly. Gold, silver, nickel, copper, tin, lead, and iron, besides marble, jasper, precious stones, and bitumen, are found in the mountainous districts of the N. W., while petroleum wells have been discovered on the Rio Vermejo; but the development of this mineral wealth has hitherto been greatly retarded by the want of proper means of transport. The most extensive forests in the State are in the region of the Gran Chaco (which extends also into Bolivia), where there is known to be 60,000 sq. miles of timber. Cacti and thistles form great thickets in parts of the country. Peach and apple trees are abundant in some districts. The native fauna includes the puma, the jaguar, the tapir, the llama, the alpaca, the vicuna, armadillos, the rhea or nandu, a species of ostrich, etc. The climate is agreeable and healthy, 97° being about the highest temperature experienced. Agriculture has of late years made great progress, large and increasing quantities of cotton, wheat, sugar-cane, tobacco, oats, maize, etc., being grown. The wheat crop is of especial importance, reaching about 200,000,000 bushels and fast increasing. The manufactures include flour, cloths, blankets, and large establishments for meat packing, etc.

As a whole, this vast country is very thinly inhabited, some parts of it as yet being very little known. The native Indians were never very numerous, and have given little trouble to the European settlers. Tribes of them yet in the savage state still inhabit the less known districts, and live by hunting and fishing. Some of the Gran Chaco tribes are said to be very fierce, and European travelers have been killed by them. The European element is strong in the republic, more than half the population being Europeans or of pure European descent. Large numbers of immigrants arrive from Southern Europe, the Italians having the preponderance among those of foreign birth. The typical inhabitants of the pampas are the *Gauchos*, a race of half-breed cattle-rearers and horse-breakers; they are almost continually on horseback galloping over the plains, collecting their herds and droves, taming wild horses, or catching and slaughtering cattle. In such occupations

Argentine

they require a marvellous dexterity in the use of the lasso and bolas.

The river La Plata was discovered in 1512 by the Spanish navigator Juan Diaz de Solis, and the La Plata territory had been brought into the possession of Spain by the end of the sixteenth century. In 1810 the territory cast off the Spanish rule, and in 1816 the independence of the United States of the Rio de la Plata was formally declared, but it was long before a settled government was established. The present constitution dates from 1853, being subsequently modified. The executive power is vested in a president—elected by the representatives of the fourteen provinces for a term of six years. A national congress of two chambers—a senate and a house of deputies—wields the legislative authority, and the republic is making rapid advances in social and political life. The external commerce is important, the chief exports being wheat, corn, wool, skins, and hides, frozen beef and mutton, tallow, bones, and flax. The wheat export is large. The imports are chiefly manufactured goods. Commerce (1914), exports \$338,776,576; imports, \$263,663,362. Length of railroads 20,500 miles. Pop. 8,000,000. Capital, Buenos Ayres. On the outbreak of the Great war of the nations the government of Argentina, although the populace was vehemently in favor of the Entente cause, maintained an attitude of neutrality. Relations were severed with Germany on September 19, 1917, following the exposure by the Washington authorities of breaches of infamous neutrality by Count Luxburg, the German Minister Plenipotentiary accredited to Argentina.

Argentine (är'jen-tin), a suburb of Kansas City, Kans. Here are large gold and silver smelting works and iron shops.

Argentite (är'jen-tit), sulphide of silver, a blackish or lead-gray mineral, a valuable ore of silver found in the crystalline rocks of many countries.

Argillaceous (är'jil-ä'shus) ROCKS are rocks in which clay prevails (including shales and slates).

Argives (är'jivz), or ARGIVI, the inhabitants of Argos; used by Homer and other ancient authors as a generic appellation for all the Greeks.

Argol. See *Argal*.

Argon, a gas rather heavier than nitrogen, found in the air in very small quantity in 1894, by Prof. Ramsay and Lord Rayleigh. Its proportions are 1 of argon to 100 of air. Its marked property is its inactivity—hence the name. One way of obtaining this ele-

ment is by passing air over heated copper, which combines with the oxygen, then over heated magnesium, which combines with the nitrogen, leaving the argon. Another method is by heating magnesium dust with dehydrated quick-lime.

Argonaut (är'gö-nawt), a mollus-cous animal of the genus *Argonauta*, belonging to the dibranchiate or two-gilled cuttle-fishes, distinguished by the females possessing a single-chambered external shell, not organically connected with the body of the animal. The males have no shell and are of much smaller size than the females. The shell is fragile, translucent, and boat-like in shape; it serves as the receptacle of the ova or eggs of the female, which sits in it with the respiratory tube or 'funnel' turned towards the carina or 'keel.' This famed mollusc swims only by ejecting water from its funnel, and it can crawl in a reversed position, carrying its shell over its back like a snail. The fact that it rises to the surface of the sea in calm weather and drifts about has given rise to its fanciful name and many fables. See also *Octopus*.

Argonauts, in the legendary history of Greece, those heroes who performed a hazardous voyage to Colchis, a far-distant country at the eastern extremity of the Euxine (Black Sea), with Jason in the ship *Argo*, for the purpose of securing the golden fleece, which was preserved suspended upon a tree, and under the guardianship of a sleepless dragon. By the aid of *Medea*, daughter of the King of Colchis, Jason was enabled to seize the fleece, and after many strange adventures, to reach his home at Iolcos in Thessaly. Among the Argonauts were Hercules, Castor and Pollux, Orpheus and Theseus.

Argo-Navis, the southern constellation of the Ship, containing the large white star Canopus, one of the brightest stars in the southern skies.

Argonne (är-gon'), a rocky, forest-clad plateau in northeast France in the Departments of Ardennes, Meuse and Marne, extending along the border of Lorraine and Champagne. It is celebrated for the campaign of Dumouriez against the Prussians in 1792, and especially for the battles fought on its soil in the great European war (q. v.), 1914-1918. Following the taking of the St. Mihiel (q. v.) salient late in September, 1918, the American troops moved toward the area back of the line between the Meuse river and the western edge of the forest of Argonne near Mezières and Sedan, where the Germans had four years' accumulation of plants and material and important railroad communications. On the night of September 25 they took the

Argonne

German first-line defenses. Though the forest proved to be a veritable nest of machine-guns, which mowed down the men in fearful numbers, the Americans could not be halted. By November 6 they had reached a point on the Meuse opposite Sedan, and the objective of their splendid advance was theirs. They had over 28,000 prisoners and more than 500 guns to their credit when, on November 11, the armistice brought an end to hostilities.

Argos (ár-gos), a town of Greece, in the northeast of the Peloponnesus, between the gulfs of Ægina and Nauplia or Argos, Pop. 9980. This town and the surrounding territory of Argolis were famous from the legendary period of Greek history onwards, the territory containing, besides Argos, Mycenæ, where Agamemnon ruled, with a kind of sovereignty, over all the Peloponnesus.

Argostoli (ár-gos'to-li), a city of the Ionian Islands, capital of Cephalonia, and the residence of a Greek bishop. Pop. 9241.

Argosy (ár-go-si), a poetical name for a large merchant vessel; derived from *Ragusa*, a port which was formerly more celebrated than now, and whose vessels did a considerable trade with England.

Argot (Fr.; ár-gō), the jargon, slang, or peculiar phraseology of a class or profession, originally the conventional slang of thieves and vagabonds, invented for the purpose of disguise and concealment.

Arguim, or ARGUIN (ár-gwim', ár-gwin'), a small island on the west coast of Africa, not far from Cape Blanco, formerly a center of trade the possession of which was violently disputed by the Portuguese, Dutch, English and French.

Argument (ár-gu-ment), a term sometimes used as synonymous with the subject of a discourse, but more frequently appropriated to any kind of method employed for the purpose of confuting or at least silencing an opponent. Logicians have reduced arguments to a number of distinct heads, such as the *argumentum ad iudicium*, which founds on solid proofs addresses to the judgment; the *argumentum ad verecundiam*, which appeals to the modesty or bashfulness of an opponent by reminding him of the great names or authorities by whom the view disputed by him is supported; the *argumentum ad ignorantiam*, the employment of some logical fallacy towards persons likely to be deceived by it; and the *argumentum ad hominem*, an argument which presses a man with consequences drawn from his

own principles and concessions, or his own conduct.

Argus (ár-gus), in Greek mythology, a fabulous being, said to have had a hundred eyes, placed by Juno to guard Io. Hence 'argus-eyed,' applied to one who is exceedingly watchful.

Argus-pheasant (*Argus giganteus*), a large, beautiful, and very singular species of pheasant, found native in the southeast of Asia, more especially in Sumatra and some of the other islands. The males measure from 5 to 6 feet from the tip of the beak to the extremity of the tail, which has two greatly elongated central feathers. The plumage is exceedingly beautiful, the secondary quills of the wings, which are longer than the primary feathers, being each adorned with a series of ocellated or eye-like spots (whence the name—see *Argus*) of brilliant metallic hues. The general body plumage is brown.

Argyle, or ARGYLL (ár-gil'), an extensive county in the southwest of the Highlands of Scotland, consisting partly of mainland and partly of islands belonging to the Hebrides group, the chief of which are Islay, Mull, Jura, Tiree, Coll, Rum, Lismore, and Colonsay, with Iona and Staffa. On the land side the mainland is bounded north by Inverness; east by Perth and Dumbarton; elsewhere surrounded by the Firth of Clyde and its connections and the sea; area, 3255 sq. m. of which the islands comprise about 1000 sq. m. It is greatly indented by arms of the sea, which penetrate far inland. The mainland is divided into the six districts of Northern Argyle, Lorn, Argyle, Cowal, Knapdale, and Kintyre. The county is exceedingly mountainous and has several lakes, the principal of which is Loch Awe. Cattle and sheep are reared in numbers, and fishing is largely carried on, as is also the making of whisky. There is but little arable land. The chief minerals are slate, marble, limestone, and granite. County town, Inverary; others, Campbeltown, Oban, and Dunoon. Pop. 1901, 73,642.

Argyle, CAMPBELLS OF, a historic Scottish family, raised to the peerage in the person of Sir Duncan Campbell of Lochow, in 1445. The more eminent members are: (1) ARCHIBALD, 2d earl, killed at the battle of Flodden, 1513.—ARCHIBALD, 5th earl, attached himself to the party of Mary of Guise, and was the means of averting a collision between the Reformers and the French troops in 1559; was commissioner of regency after Mary's abdication, but

afterwards commanded her troops at the battle of Langside; died 1573.—**ARCHIBALD**, 8th earl and marquis, born 1598; a zealous partisan of the Covenanters; created a marquis by Charles I. It was by his persuasion that Charles II visited Scotland, and was crowned at Scone in 1651. At the Restoration he was committed to the Tower, and afterwards sent to Scotland, where he was tried for high treason, and beheaded in 1661.—**ARCHIBALD**, 9th earl, son of the preceding, served the king with great bravery at the battle of Dunbar, and was excluded from the general pardon by Cromwell in 1654. On the passing of the Test Act in 1681 he refused to take the required oath except with a reservation. For this he was tried and sentenced to death. He, however, escaped to Holland, from whence he returned with a view of aiding the Duke of Monmouth. His plan, however, failed, and he was taken and conveyed to Edinburgh where he was beheaded in 1685.—**ARCHIBALD**, 10th earl and 1st duke, son of the preceding, died 1703; took an active part in the revolution of 1688-89, which placed William and Mary on the throne, and was rewarded by several important appointments and the title of duke.—**JOHN**, 2d duke and Duke of Greenwich, son of the above, born 1678, died 1743; served under Marlborough at the battles of Ramillies, Oudenarde, and Malplaquet, and assisted at the sieges of Lisle and Ghent. He incurred considerable odium in his own country for his efforts in promoting the union. In 1712 he had the military command in Scotland, and in 1715 he fought an indecisive battle with the Earl of Mar's army at Sheriffmuir, near Dunblane, and forced the Pretender to quit the kingdom. He was long a supporter of Walpole, but his political career was full of intrigue. He is the Duke of Argyle in Scott's *Heart of Midlothian*.—**GEORGE DOUGLAS CAMPBELL**, 8th duke, Baron Sundridge and Hamilton, was born in 1823. He early took a part in politics, especially in discussions regarding the Presbyterian Church of Scotland. In 1852 he became lord privy seal under Lord Aberdeen, and again under Lord Palmerston in 1859; postmaster-general in 1860; secretary for India from 1868 to 1874; again lord privy seal in 1880, but retired, being unable to agree with his colleagues on their Irish policy. He was author of *The Reign of Law*, etc. Died 1900. This eldest son, the **MARQUIS OF LORNE** (1845-1914), married the Princess Louise, fourth daughter of Queen Victoria, in

1871. He was governor-general of Canada 1878-83.

Argyro-Castro (ăr'gi-rō-Kas-trō), a town of Turkey, in Albania, 40 miles northwest of Janina; built on three ridges intersected by deep ravines, across which are several bridges. Pop. about 20,000.

Argyropulos (ăr'ji-rop'u-los), **JOHANNES**, one of the principal revivers of Greek learning in the fifteenth century. Born in Constantinople 1415; died at Rome in 1486.

Aria (ăr'i-a), in music. See *Air*.

Ariadne (a-ri-ad'ne), in Greek mythology, a daughter of Minos, King of Crete. She gave Theseus a clue of thread to conduct him out of the labyrinth after his defeat of the Minotaur. Theseus abandoned her on the Isle of Naxos, where she was found by Bacchus, who married her.

Ariana (ăr-i-a'na), the ancient name of a large district in Asia, forming a portion of the Persian Empire; bounded on the north by the provinces of Bactriana, Margiana, and Hyrcania; east by the Indus; south by the Indian Ocean and the Persian Gulf; west by Media.

Ariano (ă-rē-ă'nō), a town in South Italy, province of Avellino, 44 miles N. E. of Naples, the seat of a bishop, with a handsome cathedral. Pop. 8360.

Arians (ăr'i-anz), the adherents of the Alexandrian priest Arius, who, about A.D. 318, promulgated the doctrine that Christ was a created being inferior to God the Father in nature and dignity, though the first and noblest of all created beings; that He was not the 'Word,' or 'Wisdom,' and that He was created out of nothing. These doctrines were condemned by the Council of Nicæa in 325. Arius died in 336, and after his death his party gained considerable accessions, including several emperors, and for a time held a strong position. Since the middle of the seventh century, however, the Arians have nowhere constituted a distinct sect, although similar opinions have been advanced by various theologians in modern times.

Arica (ă-rē-kă), a seaport of Chile, 30 miles S. of Tacna; previous to 1880 it belonged to Peru. It has suffered frequently from earthquakes, being in 1868 almost entirely destroyed, part of it being also submerged by an earthquake wave. Pop. about 3000.

Arichat (ăr-i-ahăt'), a seaport town and fishing station of Nova

Scotia, on a small bay, s. coast of Madagascari Island. Pop. about 2000.

Arid Region, the name applied to that portion of the United States which owing to the paucity of rainfall is little more than a vast desert. The name has particular application to that section of country known as the Great American Desert, which roughly comprises much of the territory of Utah, Nevada, Arizona, eastern and southern California, New Mexico, and extends into the States of Sonora and Sinaloa in Mexico. In the more cultivable areas of this arid section irrigation has been put in operation by the federal government, and this has resulted in the establishment of prosperous centers of industry where before the land was a sterile waste. Much of the region, however, on account of its distance from water supply must for a long time resist all efforts at reclamation. In such places as Death Valley and the Yuma Desert the annual rainfall is less than 5 inches, these two regions being probably the driest in the world.

Ariège (ä-ré-äzh), a mountainous department of France, on the northern slopes of the Pyrenees, comprising the ancient countship of Foix and parts of Languedoc and Gascony. The principal rivers are the Ariège, Arize, and Salat, tributaries of the Garonne. Sheep and cattle are reared; the arable land is inconsiderable in extent. Capital, Foix. Area, 1890 square miles; pop. 205,684.

Ariel (ä-ri-el), the name of several personages mentioned in the Old Testament; in the demonology of the later Jews a spirit of the waters. In Shakespeare's *Tempest*, Ariel was the 'trickster spirit' whom Prospero had in his service.

Aries (ä-ri-éz; Latin), the Ram, the first of the twelve signs in the zodiac, which the sun enters at the vernal equinox, about the 21st of March. Owing to the precession of the equinoxes the sign Aries no longer corresponds with the constellation Aries, which it did 2000 years ago. It is at present in the constellation Pisces, about 30° west of the original sign.

Aril, Arillus (är'il, a-ril'us), in some plants, as in the nutmeg, an extra covering of the seed, outside of the true seed-coats, proceeding from the placenta, partially investing the seed, and falling off spontaneously. It is either succulent or cartilaginous and colored, elastic, rough, or knotted. In the nutmeg it is known as *mace*.

Arimaspians (är-i-mas'pi-ans), in ancient Greek traditions a people who lived in the extreme northeast of the ancient world. They were said to be one-eyed and to carry on

a perpetual war with the gold-guarding griffins, whose gold they endeavored to steal.

Arimathæa (är-i-ma-thé'a), a town of Palestine, identified with the modern *Ramleh*, 22 n. w. n. w. of Jerusalem.

Arion (är-i'on), an ancient Greek poet and musician, born at Methymna, in Lesbos; flourished about B.C. 625. He lived at the court of Periander of Corinth, and afterwards visited Sicily and Italy. Returning from Tarentum to Corinth with rich treasures, the avaricious sailors resolved to murder him. Apollo, however, having informed him in a dream of the impending danger, Arion in vain endeavored to soften the hearts of the crew by the power of his music. He then threw himself into the sea, when one of a shoal of dolphins, which had been attracted by his music, received him on his back and bore him to land. The sailors, having returned to Corinth, were confronted by Arion, and convicted of their crime. The lyre of Arion, and the dolphin which rescued him, became constellations in the heavens. A fragment of a hymn to Poseidon, ascribed to Arion, is extant.

Ariosto (är-i-os'tö), LUDOVICO, one of the most celebrated poets of Italy, was born at Reggio, in Lombardy, September 8, 1474, of a noble family; died June 6, 1533. His lyric poems in the Italian and Latin languages, distinguished for ease and elegance of



Ludovico Ariosto.

style, introduced him to the notice of the Cardinal Ippolito d'Este, son of Duke Ercole I of Ferrara. In 1503 Ippolito took him with him on a journey to Hungary. In this service he began and

Aristæus

finished, in ten or eleven years, his immortal poem, the *Orlando Furioso*, which was published in 1515, and immediately became highly popular. He afterwards entered the service of Alfonso I, Duke of Ferrara, the cardinal's brother. The *Orlando Furioso* is a continuation of the *Orlando Innamorata* of Bojardo, details the chivalrous adventures of the paladins of the age of Charlemagne, and extends to forty-six cantos. The best English translation is that of Rose.

Arisaka (ār-i-sā'ka), BARON NAR-IAKA, a Japanese soldier and inventor of a new type of quick-firing gun, born in 1852; died January 11, 1915. He was created a baron for his services in the Russo-Japanese war, and was made lieutenant-general in 1903.

Aristæus (ār-is-tē'us), in Greek mythology, son of Apollo and Cyrene, the introducer of bee-keeping.

Aristarchus (a-ris-tār'kus), a Greek grammarian, born at Samothrace; died at Cyprus; flourished about 155 B.C. He criticised Homer's poems with the greatest acuteness and ability, endeavoring to restore the text to its genuine state, and to clear it of all interpolations and corruptions; hence the phrase, Aristarchian criticism. His edition of Homer furnished the basis of all subsequent ones.

Aristarchus, an ancient Greek astronomer belonging to Samos, flourished between 280 and 264 B.C., and first asserted the revolution of the earth about the sun; also regarded as the inventor of the sun-dial.

Aristeas (a-ris'te-as), a personage of ancient Greek legend, represented to have lived over many centuries, disappearing and reappearing by turns.

Aristides (a-ris-tī'dēs), a statesman of ancient Greece, for his strict integrity surnamed the *Just*. He was one of the ten generals of the Athenians when they fought with the Persians at Marathon, B.C. 490. Next year he was eponymous archon, and in this office enjoyed such popularity that he excited the jealousy of Themistocles, who succeeded in procuring his banishment by the ostracism (about 483). Three years after, when Xerxes invaded Greece with a large army, the Athenians hastened to recall him, and Themistocles now admitted him to his confidence and councils. In the battle of Platea (479) he commanded the Athenians, and had a great share in gaining the victory. To defray the expenses of the Persian war he persuaded the Greeks to impose a tax, which should be paid into the hands of an officer appointed by the states collec-

tively, and deposited at Delos. The confidence which was felt in his integrity appeared in their entrusting him with the office of apportioning the contribution. He died at an advanced age about B.C. 468, so poor that he was buried at the public expense.

Aristippus (a-ris-tip'pus), a disciple of Socrates, and founder of a philosophical school among the Greeks, which was called the *Cyrenaic*, from his native city Cyrenē, in Africa; flourished 380 B.C. His moral philosophy differed widely from that of Socrates, and was a science of refined voluptuousness. His fundamental principles were—that all human sensations may be reduced to two, pleasure and pain. Pleasure is a gentle and pain a violent emotion. All living beings seek the former and avoid the latter. Happiness is nothing but a continued pleasure, composed of separate gratifications; and as it is the object of all human exertions we should abstain from no kind of pleasure. Still we should always be governed by taste and reason in our enjoyments. His doctrines were taught only by his daughter, Arêtē, and by his grandson, Aristippus the younger, by whom they were systematized. Other Cyrenaics compounded them into a particular doctrine of pleasure, and established a cult. The time of his death is unknown. His writings are lost.

Aristocracy (ār-is-tok'ra-si; Greek *aristos*, best, *kratos*, rule), a form of government by which the wealthy and noble, or any small privileged class, rules over the rest of the citizens; now mainly applied to the nobility or chief persons in a state.

Aristogeiton (-giton), a citizen of Athens, whose name is rendered famous by a conspiracy (514 B.C.) formed in conjunction with his friend Harmodius against the tyrants Hippias and Hipparchus, the sons of Pisistratus. Both Aristogeiton and Harmodius lost their lives through their attempts to free the country, and were reckoned martyrs of liberty.

Aristolochia (a-ris-to-lō'ki-a), a genus of dicotyledonous, apetalous plants, the type and principle genus of the family *Aristolochiaceae*, chiefly woody climbers; widely distributed. Eleven species are found in the United States. The species are all remarkable for their curious flowers, which present many variations, but are all constructed to capture and hold insects. The relative position of the anthers and stigmas prevents fertilization without the aid of insects. In *A. clematitis* insects bringing pollen are hindered from egress from the flower by impeding hairs, but are re-

Aristolochia

leased by the withering of these hairs when the pollen is shed. *A. sipho* (Dutchman's pipe), is cultivated as a climber.

Aristophanes (-tof'a-nēs), the greatest comic poet of ancient Greece, born at Athens probably about the year 444 B.C.; died not later than B.C. 380. Little is known of his life. He appeared as a poet in B.C. 427, and having indulged in some sarcasms on the powerful demagogue, Cleon, was ineffectually accused by the latter of having unlawfully assumed the title of an Athenian citizen. He afterwards revenged himself on Cleon in his comedy of the *Knights*, in which he himself acted the part of Cleon, because no actor had the courage to do it. Of fifty-four comedies which he composed, eleven only remain; believed to be the flower of the ancient comedy, and distinguished by wit, humor, and poetry, as also by grossness. In them there is constant reference to the manners, actions, and public characters of the day, the freedom of the old Greek comedy allowing an unbounded degree of personal and political satire. The names of his extant plays are *Acharnians*, *Knights*, *Clouds*, *Wasps*, *Peace*, *Birds*, *Lysistrata*, *Thesmophoriazusae*, *Frogs*, *Ecclesiazusae*, and *Plutus*.

Aristotle (Ar'is-totl; Gr. *Aristot'eles*) a distinguished philosopher and naturalist of ancient Greece, the founder of the Peripatetic school of philosophy, was born in 384 B.C. at Stagira, in Macedonia, died at Chalcis, B.C. 322. His father, Nicomachus, was physician to Amyntas II, king of Macedonia, and claimed to be descended from Esculapius. Aristotle had lost his parents before he came, at about the age of seventeen, to Athens to study in the school of Plato. With that philosopher he remained for twenty years, became pre-eminent among his pupils, and was known as the 'intellect of the school.' Upon the death of Plato, 348 B.C., he took up his residence at Atarneus, in Mysia, on the invitation of his former pupil, Hermias, the ruler of that city, on whose assassination by the Persians, 343 B.C., he fled to Mitylene with his wife, Pythias, the niece of Hermias. During his residence at Mitylene he received an invitation from Philip of Macedon to superintend the education of his son, Alexander, then in his fourteenth year. This relationship between the great philosopher and the future conqueror continued for a number of years, during which the prince was instructed in grammar, rhetoric, poetry, logic, ethics, and politics, and in those branches of physics which had even then made some considerable

progress. On Alexander succeeding to the throne Aristotle continued to live with him as his friend and counselor till he set out on his Asiatic campaign (334 B.C.). He returned to Athens and established his school in the Lyceum, a gymnasium attached to the temple of Apollo Lyceus, which was assigned to him by the state. He delivered his lectures in the wooded walks of the Lyceum while walking up and down with his pupils. From the action itself, or more probably from the name of the walks (*peripatoi*), his school was called Peripatetic. Pupils gathered to him from all parts of Greece, and his school became by far the most popular in Athens. The statement that he had two circles of pupils, the *esoteric* and the *exoteric*, has given rise to much controversy. By some it has been held that Aristotle published during his lifetime popular discourses with a view to make way for his doctrines in Athenian society, then impregnated with Platonic theories, and that these are called *exoteric* in contradistinction to those in which are embodied his matured opinions. It was during the time of his teaching at Athens that Aristotle is believed to have composed the great bulk of his works. On the death of Alexander a revolution occurred in Athens hostile to the Macedonian interests with which Aristotle was identified. He therefore retired to Chalcis, where he soon after died. According to Strabo, he bequeathed all his works to Theophrastus, who, with other disciples of Aristotle, amended and continued them. They afterwards passed through various hands, till, about 50 B.C., Andronicus of Rhodes put the various fragments together and classified them according to a systematic arrangement. Many of the books bearing his name are spurious, others are of doubtful genuineness. The whole are generally divided into logical, theoretical, and practical. The logical works are comprehended under the title *Organon* (instrument). The theoretical are divided into physics, mathematics, and metaphysics. The physical works (including those on natural history) are on the *General Principles of Physical Science*, *The Heavens*, *Generation and Destruction*, *Meteorology*, *Natural History of Animals*, *On the Parts of Animals*, *On the Generation of Animals*, *On the Locomotion of Animals*, *On the Soul*, *On Memory*, *Sleep and Waking*, *Dreams*, *Divination*. In mathematics there are two treatises, *On Indivisible Lines* and *Mechanical Problems*. The *Metaphysics* consist of fourteen books; the title (*Ta meta ta Physika*, 'the things following the Physics') is

Aristoxenus

the invention of an editor. The practical works embrace ethics, politics, economics, and treatises on art, and comprise the *Nicomachean Ethics* (so called because dedicated to his son, Nicomachus), the *Politics*, *Economics*, *Poetry*, and *Rhetoric*. Among the lost works are the dialogues and others to which the term *exoteric* is applied, and which were published during Aristotle's lifetime. His style is devoid of grace and elegance. His works were first printed in a Latin translation, with the commentaries of Averroes, at Venice in 1489; the first Greek edition was that of Aldus Manutius (five vols., 1495-98). For an account of the philosophy of Aristotle see *Peripatetics*.

Aristoxenus (ar-is-toks'e-nus), an ancient Greek musician and philosopher of Tarentum, born about B.C. 324. He studied music under his father Spintharus, and philosophy under Aristotle, whose successor he aspired to be. He endeavored to apply his musical knowledge to philosophy, and especially to the science of mind, but it only appears to have furnished him with far-fetched analogies and led him into a kind of materialism. There is a work by him on the *Elements of Harmony*.

Arithmetic (a-rith-met-ik; Greek *arithmos*, number) is primarily the science of numbers. As opposed to algebra it is the practical part of the science. Although the processes of arithmetical operations are often highly complicated, they all resolve themselves into the repetition of four primary operations, addition, subtraction, multiplication, and division. Of these, the two latter are only complex forms of the two former, and subtraction again is merely a reversal of the process of addition. Little or nothing is known as to the origin and invention of arithmetic. Some elementary conception of it is in all probability coeval with the first dawn of human intelligence. In consequence of their rude methods of numeration, the science made but small advance among the ancient Egyptians, Greeks, and Romans, and it was not until the introduction of the decimal scale of notation and the Arabic, or rather Indian, numerals into Europe that any great progress can be traced. In this scale of notation every number is expressed by means of the ten digits, 1, 2, 3, 4, 5, 6, 7, 8, 9, 0, by giving each digit a local as well as its proper or natural value. The value of every digit increases in a tenfold proportion from the right towards the left; the distance of any figure from the right indicating the power of 10, and the digit itself the number of those powers intended to be expressed:

Arithmetic

thus $8464 = 3000 + 400 + 60 + 4 = 3 \times 10^3 + 4 \times 10^2 + 6 \times 10 + 4$. The earliest arithmetical signs appear to have been hieroglyphical, but the Egyptian hieroglyphics were too diffuse to be of any arithmetical value. The units were successive strokes to the number required, the ten an open circle, the hundred a curled palm-leaf, the thousand a lotus flower, ten thousand a bent finger. The letters of the alphabet afforded a convenient mode of representing figures, and were used accordingly by the Chaldeans, Hebrews, and Greeks. The first nine letters of the Hebrew alphabet represented the units, the second nine tens, the remaining four together with five repeated with additional marks, hundreds; the same succession of letters with added points was repeated for thousands, tens of thousands, and hundreds of thousands. The Greeks followed the same system up to tens of thousands. They wrote the different classes of numbers in succession as we do, and they transferred operations performed on units to numbers in higher places; but the use of different signs for the different ranks clearly shows a want of full perception of the value of place as such. They adopted the letter M as a sign for 10,000 and by combining this mark with their other numerals they could note numbers as high as 100,000,000. The Roman numerals which are still used in marking dates or numbering chapters were almost useless for purposes of computation. From one to four were represented by vertical strokes, I, II, III, IIII, five by V, ten by X, fifty by L, one hundred by C, afterwards C, five hundred by D, a thousand by M. These signs were derived from each other according to particular rules, thus V was the half of X, A being also used; L was likewise the half of C. M was artistically written M and cIo, and Io, afterwards D, became five hundred. ccI represented 5000, ccIo 10,000 Iooo 50,000, cccIooo 100,000. They were also compounded by addition and subtraction, thus IV stood for four, VI for six, XXX for thirty, XL for forty, LX for sixty. Arithmetic is divided into *abstract* and *practical*; the former comprehends notation, numeration, addition, subtraction, multiplication, division, measures and multiples, fractions, powers and roots: the latter treats of the combinations and practical applications of these and the so-called *rules*, such as reduction, compound addition, subtraction, multiplication, and division; proportion, interest, profit and loss, etc. Another division is *integral* and *fractional* arithmetic, the former treating of integers, or whole numbers, and the latter of frac-

tions. Decimal fractions were invented in the sixteenth century, and logarithms, embodying the last great advance in the science, in the seventeenth century.

Arithmetical (ăr-ith-met'i-kal), pertaining to arithmetic or its operations.—*Arithmetical mean*, the middle term of three quantities in arithmetical progression, or half the sum of any two proposed numbers; thus 11 is the arithmetical mean to 8 and 14.—*Arithmetical progression*, a series of numbers increasing or decreasing by a common difference, as 1, 3, 5, 7, etc.—*Arithmetical signs*, certain symbols used in arithmetic, and indicating processes or facts. The common signs used in arithmetic are the following: + signifying that the numbers between which it is placed are to be added; — that the second is to be subtracted from the first; × that the one is to be multiplied by the other; ÷ that the former is to be divided by the latter; = signifies that the one number is equal to the other: :: :: :: are the signs placed between the members of a proportional series, as 4 : 6 :: 8 : 12. A small figure placed on the right hand of another at the top signifies the corresponding power of the number beside which it is placed, as 5², 4³, meaning the square of 5 and the cube of 4. √ placed before or over a number signifies the square root of that number; with a figure it signifies the root of a higher power, as √3, which means cube root. A period placed to the left of a series of figures indicates that they are decimal fractions.

A'rius, the originator of the *Arian* heresy. See *Arians*.

Arizona (ăr-i-zō'na), one of the United States of America, bounded south by Mexico, west by California and Nevada (the river Colorado forming the greater part of the boundary), north by Utah, and east by New Mexico; area, 113,956 square miles. The surface is generally mountainous, but many fertile and well-watered valleys lie between the ridges. Part of the surface consists of deserts often entirely destitute of vegetation. The territory belongs to the basin of the Colorado, which passes through a portion of it, besides forming the boundary; while the Gila and Little Colorado, tributaries of the Colorado, traverse it from east to west. The canyons of the Colorado form a wonderful feature, the river flowing for hundreds of miles in a deep rocky channel with walls rising perpendicularly to the height of 1,500 to 6,000 feet. In some parts timber is plentiful. The rainfall is small, and irrigation has been employed for agricultural purposes, most of the streams

being used for this purpose, in some cases by the aid of great dams. Regions apparently worthless deserts become highly productive when irrigated. Large tracts of elevated land have been found excellently adapted as pastures for sheep and cattle. Gold, silver, copper and other minerals occur abundantly and the smelting and refining of copper is the largest single industry in the state. The large Portland cement mines at Roosevelt, operated in connection with the Salt River irrigation project, are operated by the U. S. Government. The capital is Phoenix. Arizona was organized as a territory in Feb., 1863, and within recent years efforts were made to lift it into statehood. In 1910 Congress passed a bill for its admission as a separate State; in 1911 its constitution was accepted, with a reservation, and in February, 1912, it was admitted as a State. Pop. 204,354, exclusive of Indians.

Arjish (ăr-jesh') DAGH, the loftiest peak of the peninsula of Asia Minor, at the western extremity of the Anti-Taurus Range, 13,150 feet; an exhausted volcano; on the N. and N. slopes are extensive glaciers.

Ark, the name applied in our translation of the Bible to the boat or floating edifice in which Noah resided during the flood or deluge; to the floating vessel of bulrushes in which the infant Moses was laid; and to the chest in which the tables of the law were preserved—the *ark of the covenant*. This was made of shittim wood, overlaid within and without with gold, about 3½ feet long by 2½ feet high and broad, and over it were placed the golden covering or mercy-seat and the two cherubim. It was placed in the sanctuary of the temple of Solomon; before his time it was kept in the tabernacle, and was moved about as circumstances dictated. At the captivity it appears to have been either lost or destroyed.

Arkansas (ăr'kan-sq, French name), one of the United States of America, bounded north by Missouri, east by the Mississippi, which separates it from the States of Mississippi and Tennessee; south by Louisiana and Texas; and west by the States of Oklahoma and Texas; area, 53,335 square miles. The surface in the east is low, flat and swampy, densely wooded, and subject to frequent inundations from the numerous streams which water it. Towards the center it becomes more diversified, presenting many undulating slopes and hills of moderate elevation. In the west it rises still higher, being traversed by a range of hills called the Ozark, which

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attain a height of 2000 feet, Magazine Mountain rising to 2800. In various parts the prairies are of great extent; the forests also are very magnificent, containing fine specimens, principally of oak, hickory, ash, sycamore, linden, maple, locust and pine. These provide material for the lumber and timber products industry, by far the most important branch of manufactures. The principal rivers, all tributaries of the Mississippi—the Arkansas, the Red River, the White River and the Washita—have been important factors in the industrial development of the State. Mineral springs are abundant. The climate on the whole is mild and subject to no great extremes of heat and cold, but in the lower districts is unhealthy to new settlers. The staple products are cotton and maize; fruit is tolerably abundant. The State is rich in minerals, especially coal, which occurs in extensive deposits, Galena and ores of zinc, iron, copper and manganese exist. The valuable mineral bauxite occurs largely and novaculite, or hone-stone, is abundant. Arkansas was colonized as early as 1685 by the French. As a part of Louisiana it was purchased by the United States in 1803. It was erected into a separate territory in 1819, and admitted into the Union in 1836. It was one of the seceding States. The capital is Little Rock, a thriving city on the Arkansas River. The State takes its name from the Arkansas Indians. Pop. (1910) 1,574,449.

Arkansas, an affluent of the Mississippi River, which gives its name to the above State. It rises in the Rocky Mountains, about lat. 30° N., lon. 107° W., flows in a general southeasterly direction through Colorado, Kansas, Oklahoma and Arkansas, and falls into the Mississippi. Length, 2170 miles.

Arkansas City, a city of Cowley County, Kansas, the center of a rich agricultural district, and of oil and gas fields. The Chilocco Indian schools are located here. Pop. 10,250.

Arklow (ark'lō), a town in Ireland, County Wicklow, on the right bank of the Avoca, which falls into the sea about 500 yards below the town; the scene of a severe fight during the rebellion of 1798. Fishing is the chief industry. Pop. about 4200.

Arkwright (ark'rit), SIR RICHARD, famous for his inventions in cotton-spinning, was born at Preston, in Lancashire, in 1732; died 1792. The youngest of thirteen children, he was bred to the trade of a barber. When about thirty-five years of age he gave himself up exclusively to the subject of inventions for spinning cotton. The thread spun by Hargreaves' jenny

could not be used except as worst, being destitute of the firmness or hardness required in the longitudinal threads or warp. But Arkwright supplied this deficiency by the invention of the *spinning-frame*, which spins a vast number of threads of any degree of fineness and hardness, leaving the operator merely to feed the machine with cotton and to join the threads when they happen to break. His invention introduced the system of spinning by rollers, the carding, or *roving* as it is technically termed (that is, the soft, loose strip of cotton), passing through one pair of rollers, and being received by a second pair, which are made to revolve with (as the case may be) three, four, or five times the velocity of the first pair. By this contrivance the roving is drawn out into a thread of the desired degree of tenuity and hardness. His inventions being brought into a somewhat advanced state, Arkwright removed to Nottingham in 1768 in order to avoid the attacks of the same lawless rabble that had driven Hargreaves out of Lancashire. Here his operations were at first greatly fettered by a want of capital; but two gentlemen of means having entered into partnership with him, the necessary funds were obtained, and Arkwright erected his first mill, which was driven by horses, at Nottingham, and took out a patent for spinning by rollers in 1769. As the mode of working the machinery by horse-power was found too expensive, he built a second factory on a much larger scale at Cromford, in Derbyshire, in 1771, the machinery of which was turned by a water-wheel. Having made several additional discoveries and improvements in the processes of carding, roving, and spinning, he took out a fresh patent for the whole in 1775, and thus completed a series of the most ingenious and complicated machinery. Notwithstanding a series of lawsuits in defense of his patent rights, and the destruction of his property by mobs, he amassed a large fortune. He was knighted by George III in 1786.

Arlberg (arl'berh), a branch of the Rhaetian Alps, in the west of Tirol, between it and Vorarlberg, pierced by a railway tunnel, one of the longest in the world. It is 6½ miles long, was finished in November, 1883, and connects the valley of the Inn with that of the Rhine, and the Austrian railway system with the Swiss railways.

Arles (arl; anc. *Arelâtes*), a town of Southern France, dep. Bouches du Rhône, 17 miles S. of Nîmes. It was an important town at the time of Caesar's invasion, and under the later

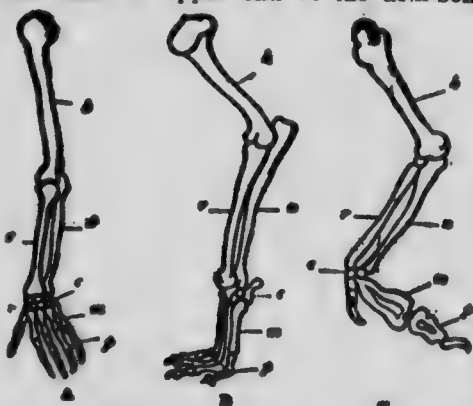
emperors it became one of the most flourishing towns on the further side of the Alps. The chief industry is silk manufacture. Pop. (1906) 16,191.

Arlington (ar'ling-tun), HENRY BENNET, EARL OF, member of the Cabal ministry, and one of the scheming creatures of Charles II, born 1618; died 1685. He is supposed to have lived and died a Roman Catholic.

Arlington, a village of Middlesex county, Massachusetts, 6 miles N.W. of Boston, seat of Mount Hope Hospital for the Insane. It has a large log-wood and spice grinding mill, and makes piano cases, ice tools, etc. Pop. 11,187.

Arlington, a village of Alexandria county, Virginia, opposite Washington, D. C. It was the home of Robert E. Lee. Now a national cemetery, where are the graves of over 18,000 soldiers. Pop. 5850 (1910). 11,187.

Arm, the upper limb in man, connected with the thorax or chest by means of the scapula or shoulder-blade, and the clavicle or collar-bone. It consists of three bones, the arm-bone (*humerus*) and the two bones of the forearm (*radius* and *ulna*), and it is connected with the bones of the hand by the carpus or wrist. The head or upper end of the arm-bone



A, Arm of Man. B, Foreleg of Dog. C, Wing of Bird. h Humerus, or bone of upper arm; r and u Radius and Ulna, or bones of the forearm; c Carpus, or bones of the wrist; m Metacarpus, or bones of the root of the hand; p Phalanges, or bones of the fingers.

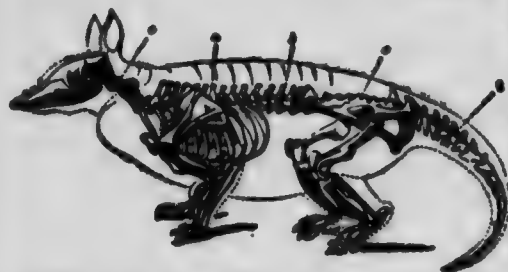
fits into the hollow called the *glenoid cavity* of the scapula, so as to form a joint of the ball-and-socket kind, allowing great freedom of movement to the limb. The lower end of the humerus is broadened out by a projection on both the outer and inner sides (the outer and inner *condyles*), and has a pulley-like surface for articulating with the forearm to

form the elbow-joint. This joint somewhat resembles a hinge, allowing of movement only in one direction. The ulna is the inner of the two bones of the forearm. It is largest at the upper end, where it has two processes, the *coronoid* and the *olecranon*, with a deep groove between to receive the humerus. The radius—the outer of the two bones—is small at the upper and expanded at the lower end, where it forms part of the wrist-joint. The muscles of the upper arm are either *flexors* or *extensors*, the former serving to bend the arm, the latter to straighten it by means of the elbow-joint. The main flexor is the *biceps*, the large muscle which may be seen standing out in front of the arm when a weight is raised. The chief opposing muscle of the biceps is the *triceps*. The muscles of the forearm are, besides flexors and extensors, *pronators* and *supinators*, the former turning the hand palm downwards, the latter turning it upwards. The same fundamental plan of structure exists in the limbs of all vertebrate animals.

Armada (ar-mā'da), the Spanish name for any large naval force; usually applied to the Spanish fleet vaingloriously designated the *Invincible Armada*, intended to act against England A.D. 1588. It was under the command of the Duke of Medina-Sidonia, and consisted of 100 great war vessels, larger and stronger than any belonging to the English fleet, with 30 smaller ships of war, and carried 19,295 marines, 8460 sailors, and was well equipped with guns. It had scarcely quitted Lisbon on May 20, 1588, when it was scattered by a storm, and had to be refitted in Corunna. It was to coöperate with a land force collected in Flanders under the Duke of Parma, and to unite with this it proceeded through the English Channel towards Calais. In its progress it was attacked by the English fleet under Lord Howard, who, with his lieutenants, Drake, Hawkins, and Frobisher, endeavored by dexterous seamanship and the discharge of well-directed volleys of shot to destroy or capture the vessels of the enemy. The great lumbering Spanish vessels suffered severely from their smaller opponents, which most of their shot missed. Arrived at length off Calais, the armada was becalmed, thrown into confusion by fire-ships, and many of the Spanish vessels destroyed or taken. The Duke of Medina-Sidonia, owing to the severe losses, at last resolved to abandon the enterprise, and conceived the idea of reconveying his fleet to Spain by a voyage round the north of Great Britain; but storm after storm assailed his

ships, scattering them in all directions, and sinking many. Some went down on the cliffs of Norway, others in the open sea, others on the Scottish coast. About thirty vessels reached the Atlantic Ocean, and of these several were driven on the coast of Ireland and wrecked. In all, seventy-two large vessels and over 10,000 men were lost.

Armadillo (Ar-ma-dil'lo; genus *Dasypus*), an edentate mammal peculiar to South America, consisting of various species, belonging to a family intermediate between the sloths and ant-eaters. They are covered with a hard bony shell, divided into belts, composed of small separate plates like a coat of mail, flexible everywhere except on the forehead, shoulders, and haunches, where it is not movable. The belts are connected by a membrane, which enables the animal to roll itself up like a hedgehog.



Skeleton of an Armadillo, showing the regions of the vertebral column. a Cervical region; b Dorsal region; c Lumbar region; d Sacral region; e Caudal region or tail.

These animals burrow in the earth, where they lie during the daytime, seldom going abroad except at night. They are of different sizes; the largest *Dasypus gigas*, being 3 feet in length without the tail, and the smallest only 10 inches. They subsist chiefly on fruits and roots, sometimes on insects and flesh. They are inoffensive, and their flesh is esteemed good food.—There is a genus of isopodous Crustacea called *Armadillo*, consisting of animals allied to the wood-lice, capable of rolling themselves into a ball.

Armageddon (är-ma-ged'don), the great battlefield of the Old Testament, where the chief conflicts took place between the Israelites and their enemies—the tableland of Esdraelon in Galilee and Samaria, in the center of which stood the town Megiddo, on the site of the modern Lejjun; used figuratively in the Apocalypse to signify the place of 'the battle of that great day of God Almighty.'

Armagh (är-mä), a county of Ireland, in the province of Ulster;

surrounded by Monaghan, Tyrone, Lough Neagh, Down, and Lowth; area 512 sq. miles, of which about a half is under tillage. The northwest of the county is undulating and fertile. The northern part, bordering on Lough Neagh, consists principally of extensive bogs. On the southern border is a range of barren hills. The chief rivers are the Blackwater, which separates it from Tyrone; the Upper Bann, which discharges itself into Lough Neagh; and the Callan, which falls into the Blackwater. There are several small lakes. The manufacture of linen is carried on very extensively. Armagh, Lurgan, and Portadown are the chief towns. The county sends three members to Parliament. Pop. 125,238.—The county town, ARMAGH, formerly a parliamentary borough, is situated partly on a hill, about half a mile from the Callan. It has a Protestant cathedral crowning the hill, a Gothic building dating from the eighth century, repaired and beautified recently; a new Roman Catholic cathedral in the pointed Gothic style, and various public buildings. It is the see of an archbishop of the Protestant Episcopal Church, who is primate of all Ireland, and is a place of great antiquity. Pop. about 7500.

Armagnac (är-mä-nyäk), an ancient territory of France, in the province of Gascony, some of the counts of which hold prominent places in the history of France. Bernard VII, son of John II, surnamed the Hunchback, succeeded his brother, John III, in 1391, and was called to court by Isabella of Bavaria, with the view of heading the Orleans in opposition to the Burgundian faction, where he no sooner gained the ascendancy than he compelled the queen to appoint him Constable of France. He showed himself a merciless tyrant, and became so generally execrated that the Duke of Burgundy, to whom Isabella had turned for help, found little difficulty in gaining admission into Paris, and even seizing the person of Armagnac, who was cast into prison in 1418, when the exasperated populace burst in and killed him and his followers. John V, grandson of the above, who succeeded in 1450, made himself notorious for his crimes. He was assassinated in his castle of Lectoure in 1473 by an agent of Louis XI, against whom he was holding out.

Armatoles (är-mä-tō'les), the war-like inhabitants of the mountain districts of Northern Greece. They have dwelt there since the 15th century, at one time ravaging the lower country as robbers, at another protecting the inhabitants from other robbers in

consideration of blackmail. The Turks, unable to subdue them, finally made terms with them, and converted them into a sort of rural police. They hated the Turkish rule, nominal as it was, and joined the Greeks, 12,000 strong, in the insurrection of 1820, gaining some degree of glory in the war of independence.

Armature (ar'ma-tūr), a term applied to the piece of soft iron which is placed across the poles of permanent or electro-magnets for the purpose of receiving and concentrating the attractive force. In the case of permanent magnets it is also important for preserving their magnetism when not in use, and hence it is sometimes termed the *keeper*. It produces this effect in virtue of the well-known law of induction, by which the armature, when placed near or across the poles of the magnet, is itself converted into a temporary magnet with reversed poles, and these, reacting upon the permanent magnet, keep its particles in a state of constant magnetic tension, or, in other words, in that constrained position which is supposed to constitute magnetism. A horseshoe magnet should therefore never be laid aside without its armature; and in the case of straight bar-magnets two should be placed parallel to each other, with their poles reversed, and a keeper or armature across them at both ends. The term is also applied to the core and coil of the electro-magnet, which revolves before the poles of the permanent magnet in the magneto-electric machine.

Armenia (ar-mē'ni-a), a mountainous country of Western Asia, not now politically existing, but of great historical interest, as the original seat of one of the oldest civilized peoples in the world. It is now shared between Turkey, Persia, and Russia. It has an area of about 137,000 square miles, and is intersected by the Euphrates, which divided it into the ancient Armenia Major and Armenia Minor. The country is an elevated plateau, inclosed on several sides by the ranges of Taurus and Anti-Taurus, and partly occupied by other mountains, the loftiest of which is Ararat. Several important rivers take their rise in Armenia, namely, the Kur or Cyrus, and its tributary the Aras or Araxes, flowing east to the Caspian Sea; the Halys or Kizil-Irmak, flowing north to the Black Sea; and the Tigris and Euphrates, which flow into the Persian Gulf. The chief lakes are Van and Urumiyah. The climate is rather severe. The soil is on the whole productive, though in many places it would be quite barren were it not for the great care taken to irrigate it.

Wheat, barley, tobacco, hemp, grapes, and cotton are raised; and in some of the valleys apricots, peaches, mulberries, and walnuts are grown. The inhabitants are chiefly of the genuine Armenian stock, a branch of the Aryan or Indo-European race; but besides them, in consequence of the repeated subjugation of the country, various other races have obtained a footing. The total number of Armenians is estimated at 2,000,000, of whom probably one-half are in Armenia. The remainder, like the Jews, are scattered over various countries, and being strongly addicted to commerce, play an important part as merchants. They retain, however, in their different colonies their distinct nationality.

Little is known of the early history of Armenia, but it was a separate State as early as the eighth century B.C., when it became subject to Assyria, as it also did subsequently to the Medes and the Persians. It was conquered by Alexander the Great in 325 B.C., but regained its independence about 190 B.C. Its king, Tigranes, son-in-law of the celebrated Mithridates, was defeated by the Romans under Lucullus and Pompey about 69-66 B.C., but was left on the throne. Since then its fortunes have been various under the Romans, Parthians, Byzantine emperors, Persians, Saracens, Turks, etc. A considerable portion of it has been acquired by Russia in the present century; part of this in 1878.

The Armenians received Christianity as early as the second century. During the Monophysitic disputes they held with those who rejected the two-fold nature of Christ, and being dissatisfied with the decisions of the Council of Chalcedon (451) they separated from the Greek Church in 536. The popes have at different times attempted to gain them over to the Roman Catholic faith, but have not been able to unite them permanently and generally with the Roman Church. There are, however, small numbers here and there of United Armenians, who acknowledge the spiritual supremacy of the pope, agree in their doctrines with the Catholics, but retain their peculiar ceremonies and discipline. But the far greater part are yet Monophysites, and have remained faithful to their old religion and worship. Their doctrine differs from the orthodox chiefly in their admitting only one nature in Christ, and believing the Holy Spirit to proceed from the Father alone. Their sacraments are seven in number. They adore saints and their images, but do not believe in purgatory. Their hierarchy differs little from that of the Greeks. The *Catholicus*, or

Armentières

Arminius

head of the church, has his seat at Etchmiadsin, a monastery near Erivan, the capital of Russian Armenia, on Mount Ararat.

The Armenian language belongs to the Indo-European family of languages, and is most closely connected with the Iranic group. The Old Armenian language differs from the modern, which contains a large intermixture of Persian and Turkish elements. The Armenian Bible, translated from the Septuagint by Isaac or Sahak, the patriarch, early in the fifth century, is a model of the classic style.

In 1896 efforts were made towards ameliorating the condition of the Armenians, which, under the oppression of their Turkish rulers, both political and religious, had become unendurable. Massacres had occurred in many places, by which thousands of the Armenians were put to death with terrible cruelty.

During the year 1915 the civilized world was shocked by reports of atrocities. About half the population had been murdered or driven to certain death in the desert from March to October.

Armentières (âr-mân-tyâr), a town in France, dep. Nord, 10 miles W.N.W. of Lille, on the Lys. The town has extensive manufactures of linen and cotton goods and an extensive trade. Pop. (1906) 25,400.

Armfelt (âr-m'felt), GUSTAV MORITZ, COUNT OF, Swedish soldier; born in 1757; died in 1814. Though he had been highly favored and loaded with honors by Gustavus III, he incurred the enmity of the Duke of Sudermania, guardian to the young king, Gustavus IV, and was deprived of all his titles and possessions. He was restored to his fortune and honors in 1799, when Gustavus IV attained his majority, and held several high military posts. Ultimately, however, he entered the Russian service, was made count, chancellor of the University of Åbo, president of the department for the affairs of Finland, member of the Russian senate, and served in the campaign against Napoleon in 1812.

Armida (âr-mê'dâ), a beautiful enchantress in Tasso's *Jerusalem Delivered*, who succeeds in bringing the hero, Rinaldo, with whom she had fallen violently in love, to her enchanted gardens. Here he completely forgets the high task to which he had devoted himself, until messengers from the Christian host having arrived at the island, Rinaldo escapes with them by means of a powerful talisman. In the sequel Armida becomes a Christian.

Armillary (âr-mi-lar-i) SPHERE (L. *armilla*, a hoop), an astro-

nomical instrument consisting of an arrangement of rings, all circles of one sphere, intended to represent the principal circles of the celestial globe, the rings standing for the meridian of the station, the ecliptic, the tropics, the Arctic and Antarctic circles, etc., in their relative positions. Its main use is to give a representation of the apparent motions of the solar system.

Arminians (âr-min'i-ans), a sect or party of Christians, so-called from James *Arminius* or *Harmensen*, a Protestant divine of Leyden, who died in 1609. They were called also *Remonstrants*, from their having presented a *remonstrance* to the States-general in 1610. The Arminian doctrines are: (1) Conditional election and reprobation, in opposition to absolute predestination. (2) Universal redemption, or that the atonement was made by Christ for all mankind, though none but believers can be partakers of the benefit. (3) That man, in order to exercise true faith, must be regenerated and renewed by the operation of the Holy Spirit, which is the gift of God; but that this grace is not irresistible and may be lost, so that men may relapse from a state of grace and die in their sins. These doctrines were vehemently attacked by the Calvinists of Holland, and were condemned by the Synod of Dort in 1619. The Arminians in consequence were treated with great severity; many of them fled to, and spread in, other countries, and though there is no longer any particular sect to which the name is exclusively applied, many bodies are classed as Arminians, as being opposed to the Calvinists on the question of predestination.

Arminius (âr-min'i-us), an ancient German hero celebrated by his fellow-countrymen as their deliverer from the Roman yoke; born about 18-16 B.C., assassinated A.D. 19. Having been sent as a hostage to Rome, he served in the Roman army, and was raised to the rank of *equus*. Returning home he found the Roman governor, Quintilius Varus, making efforts to Romanize the German tribes near the Rhine. Placing himself at the head of the discontented tribes he completely annihilated the army of Varus, consisting of three legions, in a three days' battle fought in the Teutoburg forest. For some time he baffled the Roman general Germanicus, and after many years' resistance to the vast power of the empire he drew upon himself the hatred of his countrymen by aiming at the regal authority, and was assassinated. A national monument to his memory was

inaugurated on the Grotenburg, near Detmold, in 1875.

Arminius, JACOBUS (properly JAKOB HARMENSEN), founder of the sect of Arminians or Remonstrants, was born in South Holland in 1560; died 1609. He studied at Utrecht, in the University of Leyden, and at Geneva, where his chief preceptor in theology was Theodore Beza (1582). On his return to Holland he was appointed minister of one of the churches in Amsterdam, and chosen to undertake the refutation of a work which strongly controverted Beza's doctrine of predestination; but he happened to be convinced by the work which he had undertaken to refute. Elected in 1603 professor of divinity at Leyden, he openly declared his opinions, and was involved in harassing controversies, especially with his fellow-professor, Gomarus. These contests, with the continual attacks on his reputation, at length impaired his health and brought on a complicated disease, of which he died. See *Arminians*.

Armistice (âr'mis-tis), a temporary suspension of hostilities between two belligerent powers or two armies by mutual agreement, often concluded for only a few hours to bury the slain, remove the wounded, and exchange prisoners, as also sometimes to allow of a parley between the opposing generals. A general armistice is usually the preliminary of a peace.

Armor (âr'mor). See *Arms*.

Armorer, a maker of armor or arms, or one who keeps them in repair. In the British army an armorer is attached to each troop of cavalry and to each company of infantry.

Armorica, (ar-môr'i-ka; from two Celtic words signifying 'upon the sea'), a name anciently applied to all northwestern Gaul, latterly limited to what is now Brittany. Hence *Armoric* is one name for Breton or the language of the inhabitants of Brittany, a Celtic dialect closely allied to Welsh.

Armor-plates, iron or steel plates of vessels of war are covered with the view of rendering them shot-proof. See *Iron-clad Vessels*.

Arms, COAT OF, or ARMORIAL BEARINGS, a collective name for the devices borne on shields, or banners, etc., as marks of dignity and distinction, and, in the case of family and feudal arms, descending from father to son. They were first employed by the Crusaders, and became hereditary in families at or near the close of the 12th century. They took their rise from the knights painting their ban-

ners or shields each with a figure or figures proper to himself, to enable him to be distinguished in battle when clad in armor. See *Heraldry*.

Arms, COLLEGE OF. See *Herald*.

Arms, STAND OF, the set of arms necessary for the equipment of a single soldier.

Arms and Armor. The former term is applied to weapons of offense, the latter to the various articles of defensive covering used in war and military exercises especially before the introduction of gunpowder. Weapons of offense are divisible into two distinct sections—firearms and arms used without gunpowder or other explosive substance. The first arms of offense would probably be wooden clubs, then would follow wooden weapons made more deadly by means of stone or



- A, Bascinet.
- B, Jewelled orle round the bascinet.
- C, Gorget, or gorgiere of plate.
- D, Pauldrons.
- E, Breastplate-cuirass.
- F, Rere-braces.
- G, Coudes or elbow-plates.
- H, Gauntlets.
- I, Vambrace.
- J, Skirt of taces.
- K, Military belt or cingulum, richly jeweled.
- L, Tuilles or tuillots.
- M, Cuisse.
- N, Genouilleres or knee-pieces.
- O, Jambes.
- P, Spur-straps.
- Q, Sollerets.
- R, Misericorde or dagger.
- S, Sword, suspended by a transverse belt.

Armor, from the effigy of Sir Richard Peyton, in Tong Church, Shropshire.

bone, then stone axes, slings, bows and arrows with heads of flint or bone, and afterwards various weapons of bronze. Subsequently a variety of arms of iron and steel were introduced, which comprised the sword, javelin, pike, spear or lance, dagger, axe, mace, chariot scythe, etc.; with a rude artillery consisting of catapults, ballistæ, and battering-rams. From the descriptions of Homer we know that almost all the Grecian armor, defensive and offensive, in his time was of bronze; though iron was sometimes used.

The lance, spear, and javelin were the principal weapons of this age among the Greeks. The bow is not often mentioned. Among ancient nations the Egyptians seem to have been most accustomed to the use of the bow, which was the principal projectile weapon of the Egyptian infantry. Peculiar to the Egyptians was a defensive weapon intended to catch and break the sword of the enemy. With the Assyrians the bow was a favorite weapon; but with them lances, spears, and javelins were in more common use than with the Egyptians. Most of the large engines of war, chariots with scythes projecting at each side from the axle, catapults, and ballistæ, seem to have been of Assyrian origin. During the historical age of Greece the characteristic weapon was a heavy spear from 18 to 24 feet in length. The sword used by the Greeks was short, and was worn on the right side. The Roman sword was from 22

mentioned in England in 1338, and there seems to be no doubt that they were used by the English at the siege of Cambrai in 1339. The projectiles first used for cannon were of stone. Hand firearms date from about the 14th century. At first they required two men to serve them, and it was necessary to rest the muzzle on a stand in aiming and firing. The first improvement was the invention of the match-lock, about 1476; this was followed by the wheel-lock, and about the middle of the seventeenth century by the flint-lock, which was in universal use until it was superseded by the percussion-lock, the invention of a Scotch clergyman early in the nineteenth century. The needle-gun dates from 1827. Since that date a great many improvements have been made, including the magazine rifle and the machine gun, while the power of cannons has enormously increased. The only important weapon not a firearm that has



Roman Cuirass.



Greek Armor.



Roman Cuirass—Scale armor. Chain Armor.



to 24 inches in length, straight, two-edged, and obtusely pointed, and as by the Greeks was worn on the right side. It was used principally as a stabbing weapon. It was originally of bronze. The most characteristic weapon of the Roman legionary soldier, however, was the *pilum*, which was a kind of pike or javelin, some 6 feet or more in length. The *pilum* was sometimes used at close quarters, but more commonly it was thrown. The favorite weapons of the ancient Germanic races were the battle-axe, the lance or dart, and the sword. The weapons of the Anglo-Saxons were spears, axes, swords, knives, and maces or clubs. The Normans had similar weapons, and were well furnished with archers and cavalry. The cross-bow was a comparatively late invention introduced by the Normans. Gunpowder was not used in Europe to discharge projectiles till the beginning of the fourteenth century. Cannon are first

been invented since the introduction of gunpowder is the bayonet, which is believed to have been invented about 1650. See *Cannon, Musket, Rifle*, etc.

Some kind of defensive covering was probably of almost as early invention as weapons of offense. The principal pieces of defensive armor used by the ancients were shields, helmets, cuirasses, and greaves. In the earliest ages of Greece the shield is described as of immense size, but in the time of the Peloponnesian war (about B.C. 420) it was much smaller. The Romans had two sorts of shields; the *scutum*, a large oblong rectangular highly convex shield, carried by the legionaries; and the *parma*, a small round or oval flat shield, carried by the light-armed troops and the cavalry. In the declining days of Rome the shields became larger and more varied in form. The helmet was a characteristic piece of armor among the Assyrians, Greeks, Etruscans,

and Romans. Like all other body armor, it was usually made of bronze. The helmet of the historical age of Greece was distinguished by its lofty crest. The Roman helmet in the time of the early emperors fitted close to the head, and had a neckguard and hinged cheek-pieces fastened under the chin, and a small bar across the face for a visor. Both Greeks and Romans wore cuirasses, at one time of bronze, but latterly of flexible materials. Greaves for the legs were worn by both, but among the Romans usually on one leg. The ancient Germans had large shields of plaited osier covered with leather; afterwards their shields were small, bound with iron, and studded with bosses. The Anglo-Saxons had round or oval shields of wood, covered with leather, and having a boss in the center; and they had also corselets, or coats of mail, strengthened with iron rings. The Normans were well protected by mail; their shields were somewhat triangular in shape, their helmets conical. In Europe generally metal armor was used from the tenth to the eighteenth century, and at first consisted of a tunic made of iron rings firmly sewn flat upon strong cloth or leather. The rings were afterwards interlinked one with another so as to form a garment of themselves, called *chain-mail*. Great variety is found in the pattern of the armor, and in some cases small pieces of metal were used instead of rings, forming what is called *scale-armor*. A suit of armor consisting of larger pieces of metal, called *plate-armor*, was now introduced, and the whole body came to be incased in a heavy metal covering. The various forms of ring or scale-armor were

was an elaborate and costly equipment, consisting of a number of different pieces, each with its distinctive name. In modern European armies the metal cuirass is still to some extent in use, the *cuirassiers* being heavy cavalry; and it is said that this piece of armor proves a useful defense against rifle bullets. During all the time that the use of heavy armor prevailed, the horsemen, who alone were fully armed, formed the principal strength of armies; and infantry were generally regarded as of hardly any account. England was, however, an exception, as the English archers were almost at all times, before the invention of gunpowder, an important and sometimes the chief force in the army. The bow (*long-bow*) of the English archers was from 5 to 6 feet in length, and the arrow discharged from it was itself a yard long. The long-bow continued in general use in England till the end of the reign of Elizabeth, and even as late as 1627 there was a body of English archers in the pay of Richelieu at the siege of La Rochelle.



Allecret (Light Plate) Armor, A.D. 1540.

Armstrong (arm'strang), JOHN, Scottish poet and physician, born about 1709; died 1779. After studying medicine in Edinburgh he settled in London. In 1744 he published his chief work, the *Art of Preserving Health*, a didactic poem. This work raised his reputation to a height which his subsequent efforts scarcely sustained. His later works comprised *Miscellanies* (of no value), *Medical Essays*, and a work of travel named *Launcelot Temple*.

Armstrong (arm'strang), SAMUEL CHAPMAN, educator, born in 1839 in the Hawaiian Islands, the son of a missionary. He graduated at Williams College in 1862, entered the army as a captain, and in 1863 was made lieutenant-colonel in the 9th U. S. colored infantry. He left the service in 1865 as brevet brigadier-general and was put in charge of the Freedman's Bureau station at Hampton, Va. In 1868 he opened the Hampton Normal and Agricultural Institute for negroes, Indians being subsequently admitted. Here he remained until his death in 1893, working among



Horse-armor of Maximilian I of Germany.

a, Chamfron. b, Manefaire. c, Poitrinal, poitrel, or breastplate. d, Croupiere or buttock-piece.

gradually superseded by the plate-armor, which continued to be worn until long after the introduction of firearms and field artillery. A complete suit of armor

his colored wards with the greatest devotion and the highest success.

Armstrong, WILLIAM GEORGE, LORD, engineer and mechanical inventor, born at Newcastle-on-Tyne, 26th Nov., 1810. He was trained as a solicitor, and practised as such for some time, though his tastes scarcely lay in that direction. Among his early inventions were the hydro-electric machine, a powerful apparatus for producing frictional electricity, and the hydraulic crane. In 1846 the Elswick works, near Newcastle, were established for the manufacture of his cranes and other heavy iron machinery, and these works are now among the most extensive of their kind. Here the first rifled ordnance gun which bears his name was made in 1854. (See next article.) His improvements in the manufacture of guns and shells led to his being appointed engineer of rifled ordnance under government, and he was knighted in 1858. This appointment came to an end in 1863, since which time his ordnance has taken a prominent place in the armaments of different countries. He was raised to the peerage as Baron Armstrong in 1887. Died Dec., 1900.

Armstrong Gun, a kind of cannon, so called from its inventor (see the preceding article), made of wrought-iron, principally of spirally-coiled bars so disposed as to bring the metal into the most favorable position for the strain to which it is to be exposed, and occasionally having an inner tube or core of steel, rifled with numerous shallow grooves. The size of these guns ranges from the smallest field-piece to pieces of the highest caliber. The projectile is coated with lead, and inserted into a chamber behind the bore. This the explosion drives forward, compressing its soft coating into the grooves, so as to give it a rotary motion and at the same time obviate windage. Both breech-loading and muzzle-loading Armstrong guns are made.

Army, a collection or body of men armed for war, and organized in companies, battalions, regiments, brigades, or similar divisions, under proper officers. Ancient armies from the time of Rameses II (Sesostris) of Egypt downwards, underwent a series of progressive improvements under the Assyrians, Persians, Greeks, and Carthaginians, till they reached a high degree of perfection under the Romans. In Rome every citizen from the age of seventeen to forty-six was bound to serve in the army. Under the republic a levy took place every year soon after the election of the consuls. It was superintended by the military trib-

unes, who at once formed the new levies into legions. (See *Legion*.) Under the empire a standing army was required for maintenance of order in the interior and the defense of the frontiers. In the reign of Augustus the strength of this army reached 450,000 men. The earliest military system of the Teutonic races consisted of the armed freemen, ruled by elected leaders, but even then there was a personal following or bodyguard of the king or leader. Among the countries of modern Europe the foundation of a standing army was first laid in France. Charles VII of France issued an ordinance for the creation of a number of troops of horse, and a corresponding body of infantry, the whole force amounting to 25,000 men. The superiority of such a body over an assemblage of feudal troops was soon proved, and other States imitated the example of France. By the beginning of the sixteenth century France, Germany, and Spain were all in possession of considerable standing armies. Since the middle of the eighteenth century a great change has taken place in the composition of armies through the reintroduction of the principle of the universal liability of all men capable of bearing arms in military service, or, in other words, through the raising of armies by a general conscription, which is now done in every European country.

Army of the United States. The first regular army was established by an Act of Congress passed on September 29, 1789. It provided an establishment of 700, and from this beginning has evolved, through numerous changes, the army authorized by Act of Congress of June 3, 1916. Like the army of Great Britain, that of the United States is recruited by voluntary enlistment, a system that has sufficed to produce a powerful defensive force in time of peril and under which it has been found feasible to carry on war outside of the United States, until the outbreak of the great war in which the great military powers of the Teutonic Allies have laid under contribution the man-power of their opponents to the extremest degree. The chief occasions in which the country has had to extend the enlistments may be recalled. In the War of 1812-15, about 580,000 men were brought under arms; in the Mexican War, 1846-48, about 112,000; in the Civil War, 2,780,000; in the Spanish, 1898, 313,000; in the Philippine Rebellion, 140,000; and to the Allied forces in China on the occasion of the 'Boxer Rebellion,' in 1900, 6083.

At the close of the revolution the Army of the United States was fixed at one regi-

ment of infantry of twelve companies, and one regiment of artillery of four companies, a total of 1216 officers and men. In 1791 an additional infantry regiment of 900 men was authorized. In 1798 a force of 10,000 men was raised, but was disbanded in 1800. In 1846 the army contained 7000 men. At the outbreak of the Civil War the army had a line strength of 12,931 officers and men. In 1876 Congress fixed the maximum strength of the regular army at 25,000 enlisted men. In 1893 there were 28,000 men in the army.

The actual strength of the army on June 30, 1912, was: Regular Army and Porto Rico regiment 4470 officers and 81,331 rank and file and others. In addition was the militia forces comprised of 9142 officers and 112,710 enlisted men, an effective strength increased in 1913 to 120,800. The organization of the militia, or National Guard, was under control of the States, enlistment was voluntary, and service in camp was of short duration. The different State Governors were the commanders-in-chief of the force enrolled in the respective States. Their service could be required by the President only in case of emergency, when they passed under control of the President and the officers appointed by him. In 1913, the maximum strength of the army was fixed at 100,000, and the units of organization were: 15 regiments of cavalry; 6 of field artillery; 1 corps of coast artillery; 3 battalions of engineers; 30 regiments of infantry; the Porto Rico regiment, and various staff corps and detachments.

The Act of 1916 provided for an increase of the Regular Army from a peace strength of about 100,000 to one of about 208,000. This increment, however, was to be effected by five annual additions, so that the total authorized force should not be raised till June 30, 1920. It was to comprise "the Regular Army, the Volunteer Army, the Officers' Reserve Corps, the Enlisted Reserve Corps, the National Guard while in the service of the United States, and such other land forces as are now or may hereafter be authorized by law."

The Regular Army consists of 64 regiments of infantry; 25 of cavalry; 21 of field artillery; the Coast Artillery Corps; the brigade division, army corps, and army headquarters, with their detachments and troops; General Staff Corps; Adjutant-General's Department; Inspector-General's Department; Judge-Advocate General's Department; Quartermaster Corps; Medical Department; Corps of Engineers; Ordnance Department; Signal Corps; the officers of the Bureau of Insular Affairs; the Militia Bureau; the detached officers;

the detached non-commissioned officers; the professors; the Corps of Cadets; the general army service detachment, and the detachments of cavalry, field artillery, and engineers, and the band of the United States Military Academy; the post non-commissioned staff officers; the recruiting parties; the recruit depot detachments, and unassigned recruits; the service school detachments; the disciplinary guards; the disciplinary organizations; the Indian Scouts, and such other officers and enlisted men as might later be provided for.

Soon after the United States declared war on Germany in 1917 provision was made for an enormous increase of the military forces of the nation, approximating the hitherto unheard-of total of some 3,000,000 men. It was to consist of three parts unified for the purposes of the war. The first was the Regular Army, which was to be increased by voluntary enlistment from less than 100,000 to 300,000 men. The second part consisted of the National Guard, or State militia regiments, which lost their identity, and their numerical designations as State organizations and became 'Nationalized.' The increase of the National Guard (16 divisions) authorized a total of 450,000 men. In August over 300,000 'Nationalized' National Guardsmen were in training camps throughout the United States. The third part of the military establishment was the so-called 'National Army,' composed of conscripts, men chosen by a 'selective draft.' The Emergency Army Law, which was approved May 18, 1917, provided for the registration on June 5 of all men in the country between the ages of 21 and 31. The total registered was 9,780,685, of which 1,275,902 were aliens and 80,538 alien enemies. On July 20, out of those registered, 687,000 were drafted by lot to provide the first 500,000 men of the new army. The second selective service legislation embraced all male citizens between the ages of 18 and 45, not included in the first draft. Over 13,000,000 men enrolled on September 12, 1918. The grand total of registrants in both drafts was 23,456,021. The government's plan was to have approximately 5,000,000 men under arms before the summer of 1919. The German armistice on November 11, 1918, found 4,000,000 Americans actually under arms.

The conscript army was designated as the 'National Army,' to distinguish it from the Regular Army. It was largely officered by graduates of Reserve Officers' Training Camps, of which a series were held in various parts of the country, the course lasting three months for its principal branches of the service, although in

special branches, such as aviation, the course was extended to a longer period. At the end of the training period successful candidates were granted commissions in accordance with their fitness to command and either assigned to duty or held in reserve. The training of the National Army proceeded rapidly under these officers, with experienced Regular Army officers in the higher commands, in huge army cantonments holding forty or fifty thousand men, in some cases, and as the training was completed (in about three months' time) selected contingents were sent abroad for final intensive training before entering upon active service.

In July, 1918, the War Department dropped the classification of Regulars, National Army and National Guard units. From that time all forces at home and abroad were designated solely as numerical units of the United States Army. During the great war with Germany and Austria-Hungary, 1917-18 (see *European war*), General Peyton C. March, as chief of staff, was in command of the Army of the United States, ranking General John J. Pershing, commander of the American forces in France, and General Bliss, who was America's military representative in the Council of Versailles. Lieut.-Gen. Liggett was in command of the First Army; Lieut.-Gen. Bullard commanded the Second Army. Among the corps commanders were Major-Generals Read, Cameron, Dickman, Summerall, Hines, Bundy and Wright.

The President is the constitutional commander-in-chief of the Army. The Secretary of War is responsible for the administration of the War Department, and the execution of the military policy of the President. The Chief of Staff is the technical military adviser of the Secretary of War and through him pass all orders between the War Department and the army. Similarly, he supervises the training and discipline of the troops of the line and co-ordinates the work of the different Staff Corps and departments. The duties of the General Staff include the preparation of plans for national defense and for mobilization in time of war.

Army Corps, one of the largest divisions of an army in the field, comprising all arms, and commanded by a general officer; subdivided into divisions, which may or may not comprise all arms.

Army Worm, the very destructive larva of the moth *Heliophila* or *Leucania inipuncta*, so called from its habit of gnawing in compact bodies of enormous number, devouring almost every green thing it meets. The parent moth is dark-colored. The larva is about 1½ inches long and is

found in various parts of the world, but is particularly destructive in North America. The larva of *Scidra militaris*, a European two-winged fly, is also called army worm. Scattering poison bran mash through infected fields is considered the best method of dealing with this plague.

Arnatto, or ANNOTTA. See *Annatto*.

Arnaud (ür-nō), HENRI, pastor and military leader of the Vauds of Piedmont; born 1641; died 1721. At the head of his people he successfully withstood the united forces of France and Savoy, and afterwards did good service against France in the war of the Spanish Succession. He had to retire from his country, and was followed by a number of his people, to whom he discharged the duties of pastor till his death.

Arnauld (ür-nō), the name of a French family, several members of which greatly distinguished themselves.—ANTOINE, an eminent French advocate, was born 1560; died 1619. Distinguished as a zealous defender of the cause of Henry IV and for his powerful and successful defense of the University of Paris against the Jesuits in 1594. His family formed the nucleus of the sect of the Jansenists (see *Jansenius*) in France.—His son ANTOINE, called the *Great Arnauld*, was born February 6, 1612, at Paris; died August 9, 1694, at Brussels. He devoted himself to theology, and was received in 1641 among the doctors of the Sorbonne. He engaged in all the quarrels of the French Jansenists with the Jesuits, the clergy, and the government, was the chief Jansenist writer, and was considered their head. Excluded from the Sorbonne, he retired to Port Royal, where he wrote, in conjunction with his friend Nicole, a celebrated system of logic (hence called the Port Royal Logic). On account of persecution he fled, in 1679, to the Netherlands. His works, which are mainly controversies with the Jesuits or the Calvinists, are very voluminous.—His brother ROBERT, born 1588, died 1674, was a person of influence at the French court, but latterly retired to Port Royal, where he wrote a translation of Josephus and other works. Robert's daughter, ANGÉLIQUE, born 1624, died 1684, was eminent in the religious world, and was subject to persecution on account of her unflinching adherence to Jansenism.

Arnauts. See *Albania*.

Arndt (ürnt), ERNST MORITZ, a German patriot and poet; was born 1769; died 1860. He was appointed professor of history at Greifswald in 1806, and stirred up the national feeling against Napoleon in his work *Geist der Zeit*

('Spirit of the Time'). In 1812-13 he zealously promoted the war of independence by a number of pamphlets, poems, and spirited songs, among which it is sufficient to refer to his *Was ist das Deutschen Vaterland? Der Gott, der Eisen wachsen liess, and Was blasen die Trompeten? Husaren Aereus!* which were caught up and sung from one end of Germany to the other. In 1817 he married a sister of the theologian Schleiermacher, and settled at Bonn in order to undertake the duties of professor of history. He was, however, suspended till 1840 on account of his liberal opinions, when he was restored to his chair on the accession of Frederick William IV.

Arndt, JOHANN, celebrated German mystic theologian; born 1555; died 1621. His principal work, *Wahres Christenthum* ('True Christianity'), is still popular in Germany, and has been translated into almost all European languages.

Arne (arn), THOMAS AUGUSTINE, English composer; born at London 1710; died 1778. His first opera, *Rosamond*, was performed in 1733 at Lincoln's Inn Fields, and was received with great applause. Then followed Fielding's comic opera, *Tom Thumb*, or the *Tragedy of Tragedies*. His style in the *Comus* (1738) is still more original and cultivated. To him we owe the national air *Rule Britannia*, originally given in a popular piece called the *Masque of Alfred*. After having composed two oratorios and several operas he received the title of Doctor of Music at Oxford. He composed, also, music for several of the songs in Shakespeare's dramas, and various pieces of instrumental music.

Arnee (ar-né'), one of the numerous Indian varieties of the buffalo (*Bubalus arni*), remarkable as being the largest animal of the ox kind known. It measures about 7 feet high at the shoulders, and from 9 to 10½ feet long from the muzzle to the root of the tail. It is found chiefly in the forests at the base of the Himalayas.

Arnhem, or ARNHEIM (arn'him), a town in Holland, prov. of Gelderland, 18 miles southwest of Zutphen, on the right bank of the Rhine. Pleasantly situated, it is a favorite residential resort, and it contains many interesting public buildings; manufactures cabinet wares, mirrors, carriages, mathematical instruments, etc.; has paper mills, and its trade is important. In 1795 it was stormed by the French, who were driven from it by the Prussians in 1813. Pop. 56,812.

Arnhem Land, a portion of the northern territory of S. Australia, lying west of the Gulf of Carpentaria, and forming a sort of peninsula.

Arnica (ar'ni-ka), a genus of plants, natural order *Compositae*, consisting of some 18 species found in North-western United States. One is found in Central Europe, *A. montana* (leopard's bane or mountain tobacco). It has a perennial root, a stem about 2 feet high, bearing on the summit flowers of a dark golden yellow. In every part of the plant there is an acrid resin and a volatile oil, and in the flowers an acrid bitter principle called *arnicin*. The root contains also a considerable quantity of tannin. A tincture of it is employed as an external application to wounds and bruises.

Arnim (ar'nim), ELIZABETH VON, a German writer, also known as Bettina, wife of Louis Achim von Arnim, and sister of the poet Clemens Brentano; born at Frankfurt in 1785; died at Berlin 1859. Even in her childhood she manifested an inclination towards eccentricities and poetical peculiarities of many kinds. She entered on a correspondence with Goethe, and contracted an affected and fantastic love towards him—then in his sixtieth year. In 1835 she published Goethe's *Briefwechsel mit einem Kinde* ('Correspondence with a Child'), containing, among others, the letters that she alleged to have passed between her and Goethe. Her later writings were of a politico-social character.—Her husband, LUDWIG ACHIM VON ARNIM, born at Berlin in 1781; died 1831; distinguished himself as a writer of novels. In concert with her brother, Clemens Brentano, he published a collection of popular German songs and ballads entitled *Des Knaben Wunderhorn*.—Her daughter, GISELA VON ARNIM, is known in literature by her *Dramatische Werke*, 3 vols., 1857-63.

Arnim, HARRY KARL EDUARD, COUNT VON, a Prussian diplomatist, born in 1824; died 1881. In 1870 he was ambassador to Rome; in 1872 he became ambassador to Paris, but was recalled on account of differences with Bismarck. Subsequently convicted of lese-majesty.

Arno (ar'nō; anc. *Arnus*), a river of Italy which rises in the Etruscan Apennines, makes a sweep to the south and then trends westwards, divides Florence into two parts, washes Pisa, and falls, 4 miles below it, into the Tuscan Sea, after a course of 130 miles.

Arnobius (ar-nō'bi-us), an early Christian writer, was a teacher of rhetoric at Sicca Venerea, in Numidia, and in 303 became a Christian; he died about 326. He wrote seven books

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of *Disputationes adversus Gentes*, in which he sought to refute the objections of the heathens against Christianity. This work betrays a defective knowledge of Christianity, but is rich in materials for the understanding of Greek and Roman mythology.

Arnold (Ar'nold), BENEDICT, born in Connecticut in 1741, an able general in the Revolutionary war, but who, through dissatisfaction, attempted to betray the strong fortress of West Point, with all the arms and stores there deposited, into the hands of the British. The project failed through the capture of Major André, and Arnold made his escape to the British lines. He received a commission as major-general in the British army, and took part in several marauding expeditions. His name was associated with infamy, even in England, and his after life was miserable. Died in London in 1801.

Arnold, SIR EDWIN, poet, Sanskrit scholar, and journalist, born in England in 1832. Educated at Oxford, where he took the Newdigate prize for a poem entitled the *Feast of Belshazzar* in 1852. He was successively second master in King Edward VI's College at Birmingham, and principal of the Sanskrit College at Poonah, in Bombay. In 1861 he joined the editorial staff of the *Daily Telegraph*. He was the author of *Poems*, narrative and lyrical, numerous translations from the Greek and Sanskrit; *The Light of Asia*, a poem presenting the life and teaching of Gautama, the founder of Buddhism; *The Light of the World*, etc. He died March 24, 1904.

Ar'nold, MATTHEW, English critic, essayist, and poet, was born at Laleham, near Staines, in 1822, being a son of Dr. Arnold, of Rugby. He was educated at Winchester, Rugby, and Oxford, and became a Fellow of Oriel College. He was private secretary to Lord Lansdowne, 1847-51; appointed inspector of schools, 1851; professor of poetry at Oxford, 1858; author of several volumes of poetry, *Essays in Criticism*; *On the Study of Celtic Literature*; *Literature and Dogma*; volumes of essays and other works. He enjoyed high reputation for critical ability and literary skill. He died April 15, 1888.

Ar'nold, THOMAS, head-master of Rugby School, and professor of modern history in the University of Oxford, born at Cowes, in the Isle of Wight, in 1795; died in 1842. He entered Oxford in his sixteenth year, and in 1815 he was elected Fellow of Oriel College. After taking deacon's orders he settled at Laleham, near Staines, where he em-

Arnott

ployed himself in preparing young men for the universities. In 1828 he was appointed head-master of Rugby School, and devoted himself to his new duties with the greatest ardor. While giving due prominence to the classics, he deprived them of their exclusiveness by introducing various other branches into his course, and he was particularly careful that the education which he furnished should be in the highest sense moral and Christian. His success was remarkable. Not only did Rugby School become crowded beyond any former precedent, but the superiority of Dr. Arnold's system became so generally recognized that it may be justly said to have done much for the general improvement of the public schools of England. In 1841 he was appointed professor of modern history at Oxford, and delivered his introductory course of lectures with great success. His chief works are his edition of *Thucydides*, his *Roman History*, unhappily left unfinished, and his *Sermons*. There is an admirable memoir of him by A. P. Stanley, Dean of Westminster (London, two vols., 1845).

Ar'nold of Brescia, an Italian religious and political agitator and victim of the twelfth century. He was one of the disciples of Abelard, and attracted a considerable following by preaching against the pope's temporal power. Excommunicated by Innocent II, he withdrew to Zürich, but soon reappearing in Rome he was taken prisoner and burned (1155).

Ar'nion, a river in Palestine, the boundary between the country of the Moabites and that of the Amorites, latterly of the Israelites, a tributary of the Dead Sea.

Ar'not, Ar'nut, a name of the farinaceous tubers of the earth-nut or pig-nut (*Bunium flexuosum* and *B. Bulbocastanum*). See *Earth-nut*.

Ar'nott, NEIL, an eminent physician and physicist, was born at Arbroath in 1788; died in 1874. Having graduated as M.A. at Aberdeen, he went to England, and was appointed a surgeon in the East India Company's naval service. In 1811 he commenced practice in London. In 1837 he was appointed extraordinary physician to the queen. In 1827 he published *Elements of Physics*, and in 1838 a treatise on *Warming and Ventilation*, etc. He is widely known as the inventor of a stove, which is regarded as one of the most economical arrangements for burning fuel; a ventilating chimney-valve, and his water-bed for the protection of the sick against bedsores.

Arnot'to. See *Annotto*.

Arnsberg (ärns'berh), a town in Prussia, prov. Westphalia, capital of the government of same name, on the Ruhr. Pop. 8490.

Arnstadt (ärn'stat), a town in Germany, principality of Schwarzburg-Sondershausen, 11 miles s. by w. of Erfurt, upon the Gera, which divides it into two parts. Has manufactures in leather, etc., and a good trade in grain and timber. Pop. 14,413.

Arnswalde (ärns'val-de), a town of Prussia, prov. Brandenburg, 30 miles s.e. of Stettin. Pop. 8633.

Arnulf (är'nulf), great grandson of Charlemagne, elected King of Germany in A.D. 887; invaded Italy, captured Rome, and was crowned emperor by the pope (896); died A.D. 809.

Aroides (a-roi'de-s), an order of monocotyledonous plants; same as *Araceæ*.

Arolsen (är'ol-sen), a German town, capital of the principality of Waldeck. Pop. 3000.

Aroma (a-rö'ma), the distinctive fragrance exhaled from spices, plants, etc.; generally an agreeable odor, a sweet smell.

Aromatics (är-ö-mat'iks), drugs or other substances which yield a fragrant smell, and often a warm pungent taste, as calamus (*Acorus Calamus*), ginger, cinnamon, cassia, lavender, rosemary, laurel, nutmegs, cardamom, pepper, pimento, cloves, vanilla, saffron. Some of them are used medicinally as tonics, stimulants, etc.

Aromatic vinegar, a very volatile perfume made by adding the essential oils of lavender, cloves, etc., and often camphor, to crystallizable acetic acid. It is a powerful excitant in fainting, languor, and headache.

Arona (ä-rö'nä), an ancient Italian town near the s. extremity of Lago Maggiore. Pop. 4700. In the vicinity is the colossal statue of San Carlo Borromeo, 70 feet in height, exclusive of pedestal, 42 feet high.

Aroostook (a-rö'stuk), a river of the Northeastern United States and New Brunswick, a tributary of the St. John, length 140 miles.

Aroura, Arura (a-rö'ra), an ancient Egyptian measure of surface, equal to 21,904 English square feet, or 9 poles 106.3 feet.

Arpad (är-päd'), the hero of Hungarian ballad and romance, founder of the Kingdom of Hungary, born about

870, died 907. The Arpad dynasty reigned till 1801.

Arpeggio (är-pej'ö), the distinct sound of the notes of an instrumental chord; the striking the notes of a chord in rapid succession, as in the manner of touching the harp instead of playing them simultaneously.

Arpent (är-pän), formerly a French measure for land, equal to five-sixths of an English acre; but it varied in different parts of France.

Arpino (är-pé'nö; anc. *Arpinum*), a town of Southern Italy, province of Caserta, celebrated as the birth-place of Caius Marius and Cicero. It manufactures woolens, linen, paper, etc. Pop. 10,607.

Arqua (är'kwä), a village of Northern Italy, about 13 miles s. w. of Padua, where the poet Petrarch died, 1374. A monument has been erected over his grave.

Arquebus (är'kwé-bus), a hand-gun; a species of firearm resembling a musket anciently used. It was used by horse and foot troops; sometimes cocked by a wheel, and carried a ball that weighed nearly two ounces. A larger kind used in fortresses carried a heavier shot.

Arraca'cha. See *Aracacha*.

Arracan'. See *Aracca*.

Ar'rack. See *Arack*.

Ar'ragon. See *Aragon*.

Arrah (är'ra), a town of British India, in Shahabad district, Bengal, rendered famous during the mutiny of 1857 by the heroic resistance of a body of twenty civilians and fifty Sikhs, cooped up within a detached house, to a force of 3000 sepoy, who were ultimately routed and overthrown by the arrival of a small European reinforcement. Pop. 42,968.

Arraignment (är-rän'-ment), the act of calling or setting a prisoner at the bar of a court to plead guilty or not guilty to the matter charged in an indictment or information. The pleas are, the general issue, *i. e.* not guilty, or in abatement or in bar; the prisoner may demur to the indictment or he may confess the fact.

Arran (är'ran), an island of Scotland, in the Firth of Clyde, part of Bute county; area, 165 square miles, of which about one-tenth is under cultivation. The inlet of Lamash, on the coast, forms a capacious bay, completely sheltered by Holy Island, and is one of

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the best natural harbors in the west of Scotland. The geology of Arran has attracted much attention, as furnishing within a comparatively narrow space distinct sections of the great geological formations; while the botany possesses almost equal interest both in the variety and the rarity of many of its plants. The Norse held the island until the thirteenth century. Later it sheltered Robert Bruce. Pop. about 5000.

Arrangement (a-rān'j'ment), in music, the adaptation of a composition to voices or instruments for which it was not originally written; also, a piece so adapted.

Arran Islands. See *Aran*.

Arrapachitis (ar'a-pa-kl'tis), a city of ancient Mesopotamia, located by Ptolemy between Armenia and Adiabene, though the Assyrian and Babylonian inscriptions appear to indicate a city between the lower Zab and the Tigris. In the latter region Arrapacha, capital of the Gutian kingdom, was situated, though no modern site has yet been found for this city. Arrapacha is spoken of in the time of Hammurabi (2100 B. C.), when it was apparently captured by the Assyrian King Assurnazirpal, it being one of the Assyrian cities that afterwards rebelled against Shalmaneser. After the fall of Nineveh, in 606, Arrapacha became a part of the Chaldean kingdom under Nebuchadnezzar. In the reign of Cyrus the territory of Arrapachitis was still known as the land of Gutians. The Gutian kings wrote their inscriptions in a Semitic dialect. In Genesis x, 22, Arrapachshad is represented as a son of Shem. The land of Arrapacha is mentioned as a separate country with Assyria by the Egyptians in the fifteenth century B. C.

Arraroha. See *Araroba*.

Arras (ā-rā), a town of France, capital of the department Pas-de-Calais, well built, with several handsome squares and a citadel; cathedral, public library, botanic garden, museum and numerous flourishing industries. In the middle ages it was famous for the manufacture of tapestry, to which the English applied the name of the town itself. Pop. (1906) 20,738.

Arras. A name given to large tapestries employed as wall hangings. Tapestries of this character appear to have been first made at Arras, at that time a city of Flanders, but now a city of France. Large numbers of them were there produced and given the name of their place of manufacture, this being continued after Arras ceased to be their chief center of production. The Italian

name for them is Arazzi. A series of these hangings, the most famous of them all, is that for which Raphael made designs.

Arras Campaign. In the early months of 1917 there took place in the region adjoining the city of Arras one of the most notable campaigns on the western front in the great European war. Here the Germans had stubbornly held their own for more than two years, but now they yielded suddenly to the British and French attacks and made a remarkable reverse movement to what became known as 'Hindenburg's Line,' twenty-five miles to the rear of their former position. The campaign in question began on January 11, when the British took nearly a mile of German trenches near Beaumont Hamel. On February 25, while a fog prevailed, the Germans began their great retirement, yielding about three miles in the Ancre section, including the famous Butte de Warlecourt, which had seen some of the bloodiest fighting of the war. On the following day the German retreat continued, nearly twenty-five square miles of territory being yielded to the British. March 17 was marked by the beginning of a more extended German retirement, the British and French advancing without resistance from two to four miles over a front of thirty-five miles in length. On the next day the Allies occupied the fortified town of Peronne. The German line of withdrawal was extended until it was one hundred miles in length, and the retreat continued until twelve miles had been yielded; Noyon and Nesle being given up to the French. In the end the entire Noyon salient was abandoned and the Hindenburg line was reached, twenty-five miles to the rear of the former position. By March 10 two hundred and fifty towns and villages and 1300 square miles of territory had been won by the Entente Allies.

On April 6 the British began a vigorous drive on a twelve-mile front north and south of Arras, the German positions being abandoned for two to three miles and important fortified points captured, including the 'field fortress' of Vimy Ridge (q. v.). These advances continued, several thousand prisoners being taken. On April 2 Haig making a sudden thrust north of Arras, and Nivelle did the same between Soissons and Rheims. The Hindenburg line was now reached, and to hold it the Germans threw 240,000 fresh troops against Nivelle, but without checking his advance. The British had now reached Arras and the French were near Laon, the latter storming the large town of Craonne and gaining control of the whole Craonne plateau. The successes of the Allies continued until the British held

the entire Hindenburg line for twelve miles of its length. In the succeeding period the German resistance stiffened and the opinion prevailed that their movement had been strategic in purpose, their intent being to shorten and straighten their line.

During this retirement the Germans devastated the whole country abandoned by them. The villages were destroyed, the crops as far as possible ruined, the farming utensils broken and made useless, the fruit trees cut down or otherwise injured, and in every way possible the country rendered uninhabitable.

Arrest (är-rest') is the apprehending or restraining of one's person, which, in civil cases, can take place legally only by process in execution of the command of some court or officers of justice; but in criminal cases any man may arrest without warrant or precept, and every person is liable to arrest without distinction, but no man is to be arrested unless charged with such a crime as will at least justify holding him to bail when taken. Although ordinarily applied to any legal seizure of a person, *arrest* is the term more properly used in civil cases, and *apprehension* in criminal cases.

Arrest of Judgment, in law, the stopping of a judgment after verdict, for causes assigned. Courts have power to arrest judgment for intrinsic causes appearing upon the face of the record; as when the declaration varies from the original writ; when the verdict differs materially from the pleadings; or when the case laid in the declaration is not sufficient in point of law to found an action upon.

Arretium. See *Aresso*.

Arrhenatherum (är-en-ath'e-rum), a genus of oatlike grasses of which *A. elatius*, sometimes called French rye-grass, is a valuable fodder plant.

Arrhenius (är-ren'i-us), SVANTE, a noted Swedish chemist, born at Upsala in 1859; educated at the University of Upsala, and became professor of chemistry in the University of Stockholm in 1896. He made many important original observations, and advanced the widely accepted theory of electrolytic dissociation in liquids. He has written on the *Galvanic Conductibility of Electrolytes*, and in German on electrochemistry.

Arria (är-ri-a), the heroic wife of a Roman named Cæcina Pætus. Pætus was condemned to death in 42 A. D., for his share in a conspiracy against the emperor Claudius, and was encouraged to

suicide by his wife, who stabbed herself and then handed the dagger to her husband with the words, 'It does not hurt, Pætus!'

Arriaga (är-re-äga), Manoel de, first president of the republic of Portugal. Born 1842; died 1917. He was born at Horta in the Azores and practised law in Lisbon. He was the English tutor of the late King Carlos and the Duke of Oporto and retired from this position because of his passion for democracy. He protested against the continuance of the monarchy and was one of the leaders in the movement that finally culminated in the establishment of a republic. He became Procurator General in the Portuguese Provisional Government and in August, 1911, he was elected the first constitutional President of Portugal. He was a professor of Columbia University.

Arrian (är-ri-an), or FLAVIUS ARRIANUS, a Greek historian, native of Nicomedia, flourished in the second century, under the emperors Hadrian and the Antonines. He was first a priest of Ceres; but at Rome he became a disciple of Epictetus, was honored with the citizenship of Rome, and was advanced to the senatorial and even consular dignities. His extant works are: *The Expedition of Alexander*, in seven books; a book on the affairs of India; an *Epistle to Hadrian*; a *Treatise on Tactics*; a *Periplus of the Sea of Asia and the Red Sea*; and his *Enchiridion*, an excellent moral treatise, containing the discourses of Epictetus.

Arria, in architecture, the line in which the two straight or curved surfaces of a body, forming an exterior angle, meet each other.

Arroba (a-rö'ba; Spanish), a weight formerly used in Spain, and still used in the greater part of Central and South America. In the States of Spanish origin its weight is generally equal to 25.35 lbs. avoirdupois; in Brazil it equals 32.38 lbs.—Also a measure for wine, spirits, and oil, ranging from 2¾ gallons to about 10 gallons.

Arröe, Danish Island. See *Aeröe*.

Arrondissement (ä-rön-däs-män), in France an administrative district, the subdivision of a department, or of the quarters of some of the larger cities.

Arrow (är'ö), a missile weapon, straight, slender, pointed and barbed, to be shot with a bow. See *Archery*, *Bow*.

Arrowhead (är'o-hed; *Sagittaria*), a genus of aquatic plants found in all parts of the world

Arrowheaded Characters

Arsenic

within the torrid and temperate zones; nat. order *Alismaceae*; distinguished by possessing barren and fertile flowers, with a three-leaved calyx and three colored petals. The common arrowhead (*S. latifolia*) has a tuberous root, nearly globular, and is known by its arrow-shaped leaves with lanceolate straight lobes.

Arrowheaded Characters. See Cuneiform Writing.

Arrow Lake, an expansion of the Columbia River, in British Columbia, Canada; about 95 m. long from N. to S.; often regarded as forming two lakes—Upper and Lower Arrow Lake.

Arrowrock Dam, the highest in the world, formally dedicated at Boise, Idaho, October 4, 1911. The dam is 352 feet high, 1100 feet long, and 240 feet wide at the base, tapering to 16 feet at the top. Work on the dam was begun in 1911 by the Reclamation Service, under the direction of F. H. Arrowsmith, supervising engineer of the Idaho District; Charles H. Paul, construction engineer, and James Mann, superintendent of construction. The cost was \$5,000,000. The dam, which is built of solid concrete, crosses the Boise River some distance above the city of Boise, and forms a lake 18 miles long and 200 feet deep. An area of 243,000 acres is to be irrigated by means of the project.

Arrow-root, a starch largely used for food and for other purposes. Arrow-root proper is obtained from the rhizomes or rootstocks of several species of plants of the genus *Maranta* (nat. order *Marantaceae*), and perhaps owes its name to the scales which cover the rhizome, which have some resemblance to the point of an arrow. The species from which arrow-root is most commonly obtained is *M. arundinacea*, hence called the *arrow-root plant*. Brazilian arrow root, or tapioca meal, is not utilisissima, after the poisonous juice has been got rid of; East Indian arrow-root, from the large rootstocks of *Curcuma angustifolia*, Chinese arrow-root, from the creeping rhizomes of *Nelumbium speciosum*; English arrow-root, from the potato; Portland arrow-root, from the corms of *Arum maculatum*; and Oswego arrow-root, from Indian corn.

Arrowsmith (ar'o-smith), AARON, a distinguished English cartographer, born 1750; died 1823; he raised the execution of maps to a perfection it had never before attained. His nephew, JOHN, born 1790, died 1873, was no less distinguished in the same field;

his *Atlas of Universal Geography* may be specially mentioned.

Arroyo (ar-ro'yo), the name of two towns of Spain, in Extremadura, the one, called Arroyo del Puerco (population 7004), about 10 miles west of Cáceres; the other, called Arroyo Molinos de Montanches, about 27 miles southeast of Cáceres, memorable from the victory gained by Lord Hill over a French force under General Gérard, in 1811. Pop. 2000.

Arru, or ARU (ar'u), ISLANDS, a group belonging to the Dutch, south of western New Guinea, and extending from north to south about 127 miles. They are composed of coralline limestone, nowhere exceeding 200 feet above the sea, and are well wooded and formerly fertile. The natives belong to the Papuan race, with an intermixture of foreign blood, and are partly Christians. The chief sports are trepang, to which is added mother-of-pearl, and edible birds' nests. Pop. of group about 10,000.

Arsaces (ar'sa-sēs), the founder of a dynasty of Parthian kings (256 B.C.), who, taking their name from him, are called Arsacids. There were thirty-one in all. See *Parthia*.

Arsenias (ar-sē-mās'), a manufacturing town in the Russian government of Nijni-Novgorod, on the Tessa, 250 miles east of Moscow, with a cathedral and large convent. Pop. 10,891.

Arsenal (ar'sen-al), a royal or public magazine or place appointed for the making, repairing, keeping, and issuing of military stores. An arsenal of the first class should include factories for guns and gun-carriages, and military materials of all kinds. All the European nations have large and important arsenals and there are a number of them in the United States, but individually these are of minor importance.

Arsenic (ar'sen-ik; symbol As, atomic weight 75), a metallic element of common occurrence, being found in combination with many other metals in a variety of minerals. It is of a tin-white color, and readily tarnishes on exposure to moist air, first changing to yellow, then to gray, then black. In hardness it equals copper; it is extremely brittle, and very volatile, beginning to sublime before it melts. It burns with a blue flame, and emits a smell of garlic. Its specific gravity is 5.76. It forms alloys with most of the metals. Combined with sulphur it forms orpiment and realgar, which are the yellow and red sulphides of arsenic. Orpiment is the true arsenicum of the ancients. With oxygen

arsenic forms two compounds, the more important of which is arsenious oxide or arsenic trioxide (As_2O_3), which is the *white arsenic*, or simply *arsenic* of the shops. It is usually seen in white, glassy, translucent masses, and is obtained by sublimation from several ores containing arsenic in combination with metals, particularly from arsenical pyrites. Of all substances arsenic is that which has most frequently occasioned death by poisoning, both by accident and design. The best remedies against the effects of arsenic on the stomach are hydrated sesquioxide of iron or gelatinous hydrate of magnesia, or a mixture of both, with copious draughts of bland liquids of a mucilaginous consistence, which serve to procure its complete ejection from the stomach. Oils and fats generally, milk, albumen, wheat-flour, oatmeal, sugar and syrup have all proved useful in counteracting its effect. Like many other virulent poisons, it is a safe and useful medicine, especially in skin diseases, when judiciously employed. It is used as a flux for glass, and also for forming pigments. The arsenite of copper (Scheele's green) and a double arsenite and acetate of copper (emerald green) are largely used by painters; they are also used to color paper-hangings for rooms, a practice not unaccompanied with considerable danger, especially if flock-papers are used or if the room is a confined one. Arsenic has been too frequently used to give that bright green often seen in colored confectionery, and to produce a green dye for articles of dress and artificial flowers.

Arshin (ar-shén'), a Russian measure of length equal to 28 inches.

Arsinoë (ar-sin'o-ë), a city of ancient Egypt on Lake Moeris, said to have been founded about B.C. 2300, but renamed after Arsinoë, wife and sister of Ptolemy II of Egypt, and called also *Crocodilopolis*, from the sacred crocodiles kept at it.

Arsis (ar'sés), a term applied in prosody to that syllable in a measure where the emphasis is put; in elocution, the elevation of the voice, in distinction from *thesis*, or its depression. *Arsis* and *thesis*, in music, are the strong position and weak position of the bar, indicated by the down-beat and up-beat in marking time.

Arson (ar'son), in common law, the malicious burning of a dwelling-house or outhouse of another man, which by the common law is felony, and which, if homicide result, is murder. Also, the willful setting fire to any church, chapel, warehouse, mill, barn, agricultural produce, ship, coal-mine, and the like. In

Scotland it is called *willful fire-raising*. In the United States and Great Britain it is a considerable aggravation if the burning is to defraud insurers.

Art, in its most extended sense, as distinguished from nature on the one hand and from science on the other, has been defined as every regulated operation or dexterity by which organized beings pursue ends which they know beforehand, together with the rules and the result of every such operation or dexterity. In this wide sense it embraces what are usually called the useful arts. In a narrower and purely æsthetic sense it designates what is more specifically termed the fine arts, as architecture, sculpture, painting, music, and poetry. The useful arts have their origin in positive practical needs, and restrict themselves to satisfying them. The fine arts minister to the sentiment of taste through the medium of the beautiful in form, color, rhythm, or harmony. See *Painting*, *Sculpture*, etc.—In the middle ages it was common to give certain branches of study the name of arts. See *Arts*.

Arta (ár'ta), a gulf, town, and river of Northwestern Greece. The town (ancient *Ambracia*) was transferred by Turkey to Greece in 1881 (pop. 8000). It stands on the river Arta, which for a considerable distance above its mouth forms a part of the new boundary between Greece and Turkey.

Artaxerxes (ar-taks-erks'és; Old Pers. *Artakshatra*, 'the mighty'), the name of several Persian kings:—1. **ARTAXERXES**, surnamed **LONGIMANUS**, succeeded his father Xerxes ? B.C. 465. He subjected the rebellious Egyptians, terminated the war with Athens, governed his subjects in peace, and died B.C. 425.—2. **ARTAXERXES**, surnamed **MNEMON**, succeeded his father Darius II in the year 405 B.C. After having vanquished his brother Cyrus he made war on the Spartans, who had assisted his enemy, and forced them to abandon the Greek cities and islands of Asia to the Persians. On his death, B.C. 359, his son Ochus ascended the throne under the name of—3. **ARTAXERXES OCHUS** (359 to 339 B.C.). After having subjected the Phœnicians and Egyptians, and displayed great cruelty in both countries, he was poisoned by his general Bagoas.

Artedi (ár-tá'dé), PETER, a Swedish naturalist, born 1705, drowned at Amsterdam 1735. He studied at Upsala, turned his attention to medicine and natural history, and was a friend of Linnaeus. His *Bibliotheca Ichthyologica* and *Philosophia Ichthyologica*, together with

a life of the author, were published at Leyden in 1738.

Artemis (ar-te-mis), an ancient Greek divinity, identified with the Roman Diana. She was the daughter of Zeus (Jupiter) and Leto or Latona, and was the twin sister of Apollo, born in the island of Delos. She is variously represented as a huntress, with bow and arrows; as a goddess of the nymphs, in a chariot drawn by four stags; and as the moon goddess, with the crescent of the moon above her forehead. She was a maiden divinity, never conquered by love, except when Endymion made her feel its power. She demanded the strictest chastity from her worshipers, and she is represented as having changed Actæon into a stag, and caused him to be torn in pieces by his own dogs, because he had secretly watched her as she was bathing. The Artemisia was a festival celebrated in her honor at Delphi. The famous temple of Artemis at Ephesus was considered one of the wonders of the world, but the goddess worshiped there was very different from the huntress goddess of Greece, being of Eastern origin, and regarded as the symbol of fruitful nature.

Artemisia (ar-te-mis'i-a), a genus of plants of numerous species, nat. order Compositæ, comprising mugwort, southern wood, and wormwood. Certain alpine species are the flavoring ingredient in absinthe. See *Wormwood*.

Artemisia, Queen of Caria, in Asia Minor, about 352-350 B.C., sister and wife of Mausolus, to whom she erected in her capital, Halicarnassus, a monument, called the Mausoleum, which was reckoned among the seven wonders of the world.

Artemisium (ar-te-mis'i-um), a promontory in Eubœa, an island of the Ægean, near which several naval battles between the Greeks and Persians were fought, B.C. 480.

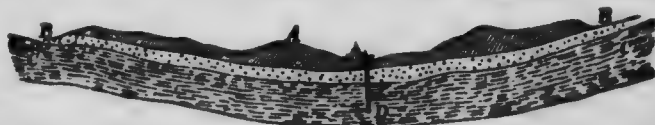
Artemus Ward. See *Brown*, *Charles Farrar*.

Arteries (ar'ter-ēz), the system of cylindrical vessels or tubes, membranous, elastic, and pulsatile, which convey the blood from the heart to all parts of the body, by ramifications which as they proceed diminish in size and increase in number, and terminate in minute capillaries uniting the ends of the arteries with the beginnings of the veins. There are two principal arteries or arterial trunks; the *aorta* which rises from the left ventricle of the heart and ramifies through the whole body, sending off great

branches to the head, neck, and upper limbs, and downwards to the lower limbs, etc.; and the *pulmonary artery*, which conveys venous blood from the right ventricle to the lungs, to be purified in the process of respiration.

Arteriotomy (ar-te-ri-ot'o-mi), the opening or cutting of an artery, as, for instance, for the purpose of blood-letting, to relieve pressure of the brain in apoplexy.

Artesian (ar-tēz'yan) **WELLS**, so called from the French province of Artois, where they appear to have been first used on an extensive scale, are perpendicular borings into the ground through which water rises to the surface of the soil, producing a constant flow or stream, the ultimate sources of supply being higher than the mouth of the boring, and the water thus rising by the well-known law. They are generally sunk in valley plains and districts where the lower pervious strata



Artesian Well (b) in the London Basin.

are bent into basin-shaped curves. The rain falling on the outcrops of these saturates the whole porous bed, so that when the bore reaches it the water by hydraulic pressure rushes up towards the level of the highest portion of the strata. The supply is sometimes so abundant as to be used extensively as a moving power, and in arid regions for fertilizing the ground, to which purpose artesian springs have been applied from a very remote period. Thus many artesian wells have been sunk in the Algerian Sahara which have proved an immense boon to the district. The same has been done in the arid region of the United States. The water of most of these is potable, but a few are a little saline, though not to such an extent as to influence vegetation. The hollows in which London and Paris lie are both perforated in many places by borings of this nature. At London they were first sunk only to the sand, but more recently into the chalk. One of the most celebrated artesian wells is that of Grenelle near Paris, 1798 feet deep, completed in 1841, after eight years' work. One at Rochefort, France, is 2765 feet deep, at Columbus, Ohio, 2775, at Pesth, Hungary, 3182, and at St. Louis, Mo., 3843½. Artesian borings have been made in West Queensland 4000 feet deep. At Schladebach, in Prussia, there is one

nearly a mile deep. As the temperature of water from great depths is invariably higher than that at the surface, artesian wells have been made to supply warm water for heating manufactories, green-houses, hospitals, fishponds, etc. The petroleum wells of America are of the same technical description. These wells are now made with larger diameters than formerly, and altogether their construction has been rendered much more easy in modern times. See *Boring*.

Arteveld, ARTEVELDE (âr'te-velt, âr'te-vel-de), the name of two men distinguished in the history of the Low Countries. 1. JACOB VAN, a brewer of Ghent, born about 1300; was selected by his fellow-townsmen to lead them in their struggles against Count Louis of Flanders. In 1338 he was appointed captain of the forces of Ghent, and for several years exercised a sort of sovereign power. A proposal to make the Black Prince, son of Edward III of England, governor of Flanders led to an insurrection, in which Arteveld lost his life (1345).—2. PHILIP, son of the former, at the head of the forces of Ghent, gained a great victory over the Count of Flanders, Louis II, and for a time assumed the state of a sovereign prince. His reign proved short-lived. The Count of Flanders returned with a large French force, fully disciplined and skillfully commanded. Arteveld was rash enough to meet them in the open field at Roosebeke, between Courtray and Ghent, in 1382, and fell with 25,000 Flemings.

Arthritis (âr-thrî'tis; Greek *arthron*, a joint), any inflammatory distemper that affects the joints, particularly chronic rheumatism or gout.

Arthrodia (âr-thrô'di-a), a species of articulation, in which the head of one bone is received into a shallow socket in another; a ball-and-socket joint.

Arthropoda (âr-throp'o-da), one of the two primary divisions (Anarthropoda being the other) into which modern naturalists have divided the subkingdom Annulosa, having the body composed of a series of segments, some always being provided with articulated appendages. The division comprises Crustaceans, Spiders, Scorpions, Centipedes, and Insects.

Arthrozoa (âr-thrô-zô'a), a name sometimes given to all articulated animals, including the arthropoda and worms.

Arthur (âr'thur), CHESTER ALAN, twenty-first president of the United States, born in 1830, was the son of Scottish parents, his father being pastor of Baptist churches in Vermont

and New York. He chose law as a profession, and practised in New York. As a politician he became a leader in the Republican party. During the Civil war he was energetic as quarter-master-general of New York in getting troops raised and equipped. He was afterwards collector of customs for the port of New York. In 1880 he was elected vice-president, succeeding as president on the death of Garfield in 1881, and in this position he gave general satisfaction. He died Nov. 18, 1886.

Arthur, KING, a legendary British hero of the sixth century, son of Uther Pendragon and the Princess Igerna, wife of Gorlois, Duke of Cornwall. He married Guinevere or Ginevra; established the famous order of the Round Table; and reigned, surrounded by a splendid court, twelve years in peace. After this, as the poets relate, he conquered Denmark, Norway, and France, slew the giants of Spain, and went to Rome. From thence he is said to have hastened home on account of the faithlessness of his wife, and Modred, his nephew, who had stirred up his subjects to rebellion. He subdued the rebels, but died in consequence of his wounds, on the island of Avalon. The story of Arthur is supposed to have some foundation in fact, and has ever been a favorite subject with English romanticists and poets. Some believe that he was one of the great Celtic chiefs who led his countrymen from the west of England to resist the settlement of the Saxons in the country; but others regard him as a leader of the Cymry of Cumbria and Strath-Clyde against the Saxon invaders of the east coast and the Picts and Scots north of the Forth and the Clyde.

Arthur's Seat, a picturesque hill within the Queen's Park in the immediate vicinity of Edinburgh; has an altitude of 822 feet; descends rollingly to the N. and E. over a base each way of about five furlongs; presents an abrupt shoulder to the S., and breaks down precipitously to the W. It is composed of a diversity of eruptive rocks, with some interposed and uptilted sedimentary ones; and derives its name somehow from the legendary King Arthur.

Artiad (âr'ti-ad; Gr. *artios*, even-numbered), in chemistry, a name given to an element of even equivalency, as a dyad, tetrad, etc.; opposed to a perissad, an element of uneven equivalency, such as a monad, triad, etc.

Artichoke (âr'ti-chôk; *Cynara scolymus*), a well-known plant of the nat. order Compositae, somewhat resembling a thistle, with large divided

prickly leaves. The erect flower-stem terminates in a large round head of numerous imbricated oval spiny scales which surround the flowers. The fleshy bases of the scales with the large receptacle are the parts that are eaten. Artichokes were introduced into England early in the sixteenth century. The Jerusalem artichoke (a corruption of the Ital. *girasole*, a sunflower), or *Helianthus tuberosus*, is a species of sunflower, whose roots are used like potatoes.

Article (ar'ti-k'l), in grammar, a sound to limit or define their application. In English *a* or *an* is usually called the indefinite article (the latter form being used before a vowel sound), and *the*, the definite article, but they are also described as adjectives. *An* was originally the same as *one*, and *the* as *that*.

Articles of Confederation

AND PERPETUAL UNION OF THE COLONIES (the original thirteen), were first submitted by Dr. Benjamin Franklin, July 21, 1775, to the assembly of State delegates called the Continental Congress. They formed the basis of a plan reported to that congress, July 12, 1776. This, after amendment, was agreed to by congress, but was not ratified by all the States until March 1, 1781. The government thus formed was a feeble one, and was set aside in 1789 by the adoption of the present constitution of the United States.

Articles, THE SIX, in English ecclesiastical history, articles imposed by a statute passed in 1539, in the reign of Henry VIII. They decreed the acknowledgment of transubstantiation, the sufficiency of communion in one kind, the obligation of vows of chastity, celibacy of the clergy, auricular confession, and permission of private masses. The act was repealed in 1549.

Articles, THE THIRTY-NINE, of the Church of England, a statement of the particular points of doctrine, thirty-nine in number, maintained by the English Church; first promulgated by a convocation held in London in 1562-63, and confirmed by royal authority; founded on and superseding an older code issued in the reign of Edward VI. They were ratified anew in 1604 and 1628. All candidates for ordination must subscribe these articles, which are now accepted by the Episcopal Churches of Scotland, Ireland, and America.

Articulata (ar-tik-u-la'ta), the third great section of the animal kingdom according to the arrangement of Cuvier, including all the invertebrates with the external skeleton forming

a series of rings articulated together and enveloping the body, distinct respiratory organs, and an internal ganglionated nervous system along the middle line of the body. They are divided into five classes, viz., Crustacea, Arachnida, Insecta, Myriapoda, and Annelida. The term is no longer in use, the first four classes being now grouped together under the name of *Arthropoda*. The whole are sometimes called *Arthrozoa*.

Articulation (ar-tik-u-la'shun), in anatomy a joint; the joining or juncture of the bones. This is of three kinds: (1) *Diarthrosis*, or a movable connection, such as the ball-and-socket joint; (2) *Synarthrosis*, immovable connection, as by suture, or junction by serrated margins; (3) *Symphysis*, or union by means of another substance, by a cartilage, tendon, or ligament.

Artillery (ar-til'e-ri), a general term applied to great guns, cannon, or ordnance of all varieties, and also to the military body by whom these arms are served. The method of manufacture of artillery is treated under Cannon (*q. v.*). Here its history and development will be dealt with. This history may be held to date from the discovery of gunpowder, which seems to have been known to the Chinese at a period several centuries before the Christian era. The date of the use of this explosive for warlike purposes, however, is a matter of much doubt. It is said to have been employed in cannon of some kind by the Chinese and the Arabs and to have been employed in the wars between the Moors and Christians in Spain in the 12th century, artillery being used by the Moors against Saragossa in 1118, and later in the defense of Niebla. In the following century it is said to have been used by Henry III of England and by the Spaniards against Cordova. Much of this, however, is very questionable, and the earliest fully authentic dates which we can give are those of the improvement in the manufacture of gunpowder by Berthold Schwartz, a German monk, about 1320, and of the use of cannon by Edward III of England in his war with the Scotch in 1327. This king is also said to have used cannon at Crécy in 1346, where he had an artillery train and an ordnance establishment of several hundred men, though only twelve of these are spoken of as artillerymen and gunners. The cannon used bore the name of 'crake,' those of Edward being termed 'crakes of war.' Such a powerful agent, far surpassing in its capability the ballistic type of machine, quickly attracted the attention of the medieval world, and before the end of the 14th century it was in general

use throughout Europe, Russia being the last nation to adopt it. The 500th anniversary of its introduction into that country was celebrated in 1889.

The guns of this early period were of the rudest make, being very crude and inefficient. While useful in sieges, they played an inferior part in battles, their weight and the bad roadways of that day unfitting them for rapid maneuvers. These clumsy pieces, with flaring mouths and contracted chambers, were made first of wood, afterwards of iron bars. These were hooped with iron rings—a method still in use, though under very different conditions. The balls fired from them were of rounded stone, iron balls coming later into use. An example of this primitive type of cannon is still in existence in Edinburgh Castle. This is named 'Mons Meg,' and was used in 1455 at the siege of Shrieve Castle by James II of Scotland. It weighs nearly four tons and threw a stone ball weighing over 300 pounds. Five years later James was killed by the explosion of a similar cannon, the 'Lion.' In the century in question, the 15th, marked progress in cannon-making showed itself. The older 'bombards' were replaced by brass guns, and the cumbersome beds upon which the earlier ordnance was transported gave place to rude artillery carriages on wheels, iron balls now replacing those of stone. Towards the end of the century, Charles VIII of France used a numerous train of cannon in his Italian campaigns, and the same may be said of Louis XII, whose success in Italy was largely due to this arm and to the improved organization of the artillery service. The mobility of the guns was increased by Francis I, who adopted a lighter field gun and drew his pieces with the most capable horses.

In England less progress was made, though Henry VII and Henry VIII did much to improve the artillery service. The heavy pieces, known as 'culverins' and by other names, were drawn by oxen, the smaller field guns, 2, 4, 6½ and 8 pounders, known as 'falconets,' 'falcons,' and 'sacres,' being drawn by horses. Little progress was made in England in the succeeding centuries, the 16th and 17th, though in the first half of the latter the artillery service was greatly improved in name and still more so in Sweden, where Gustavus Adolphus did much towards giving the artillery its true position in the battlefield. Mobility and rapidity of fire were his main points. He was the first to appreciate fully the value of concentration of fire, frequently massing his guns in strong batteries at the center and flanks. He also was alive to the advantage of having both heavy and light ar-

tillery, it being his practice in a retreat to withdraw his heavy guns, while protecting them with his light field pieces. It was largely to his artillery that he owed his famous success in the Thirty Years' war, the guns of his opponents being of the old unwieldy types. No man had as yet done so much as he in developing the use of this arm of the service.

The 18th century was one of much progress in the artillery branch of the army. In England the Duke of Marlborough was made master-general of the ordnance in 1702 and in his subsequent career aided his victorious movements by efficient use of his guns. The batteries were increased in size and number, and in 1706 a force of 11,000 men had 46 guns and 60 mortars, the latter being mounted on traveling carriages. In 1716 the Royal Regiment of Artillery began its career, and in later years played an active part on many well-fought fields. But in the Napoleonic wars the British artillery lacked the mobility of that of its great opponent, a skilled artillery officer, who made the efficiency of this branch of the service a leading feature in his remarkably successful career. He withdrew the guns from the battalions, organized them into batteries, and assigned these to infantry divisions, thus adding to their efficiency. Other improvements were a reduction of the calibers for field-batteries to 6-pounder guns and 24-pounder howitzers, and those of the horse-batteries to 4-pounders. Military drivers were employed for the latter, instead of teamsters hired by contract, as in former wars. It was Napoleon's custom always to hold in reserve a large number of guns to be brought into use at the decisive stage of the battle, concentrating on the enemy the fire from separate masses of guns. As his infantry was reduced in numbers he increased his supply of artillery. Thus at Austerlitz the proportion was 2½ guns, while at Wagram it was nearly 4 for each 1000 men of other arms.

When the American Civil War began, the field artillery of the army consisted of eight batteries, but most of the sea-coast artillery was quickly converted into light batteries and many new batteries were promptly organized. The armament consisted of 3-inch rifled field guns, 6- and 12-pounder bronze smooth bores, 12-pounder bronze mountain howitzers, and 12-, 24- and 32-pounder bronze field howitzers. The range of the 3-inch guns was 2800 yards, and that of the 12-pounder (known as the Napoleon gun) was about 1500 yards. The Eastern armies had artillery divisions of 4 batteries each, these divisions being organized into corps, but in 1863 this system was abolished and the

batteries of each corps were converted into an artillery brigade. The Western and the Confederate armies did not differ materially from this in their artillery organization. The ranges of gun fire ordinarily employed varied from one-half to one mile, though on occasions guns were employed at much shorter distances. It has been said of this war that 'It developed the use of masses of guns to an extent unknown since the days of Napoleon. It infused into the handling of that arm a degree of audacity foreshadowing the tactics of 1870. And if its offensive use of masses had not been all that could be wished, this was due to causes beyond the control of the arm itself.'

As regards the wars subsequent to the one here considered, it must suffice to say that the use of artillery in battle has steadily grown in importance, while that of small arms has decreased, until in the European war of the 20th century, it grew into stupendous proportions, dwarfing all the minor arms effective in former warfare, putting cavalry almost completely out of service, and forcing the armies to seek refuge underground from the prodigious tornado of shot and shell.

Aside from the historical details of the growing use of artillery, so far given, is that of the development of the gun itself, from the crude weapon employed by Edward III to the huge and powerful siege gun, with its marvelous range, of the present day. These great steps of advance include those of rifling, breech-loading, and the employment of explosive shells, in place of the solid shell of early gunnery. It is said that the principles of rifling and breech-loading had been experimented with in England as early as 1547. But any such experiments must have been ineffective, since rifled siege guns were first brought into practical use by the British during the Crimean war, at the siege of Sebastopol. These were poorly constructed and had little useful effect. A few years later the rifled gun, fitted with the breech-loading device, was used in the 1860 China campaign, and was subsequently made a definite feature of the British artillery. The first appearance of rifled field guns in battle was in the Italian war of 1859, this improvement in gunnery being of French invention. During the American Civil War the effective range of field guns was increased by this improvement to 2500 yards. Muzzle-loading rifled guns played a prominent part in this war. The third improvement in cannon, that of using a hollow shell filled with an explosive, in place of the solid shell of the past centuries, was one that added greatly to the destructiveness

of artillery fire, especially since the invention of shrapnel by Major Shrapnel in 1802. In this the shell is packed with balls or bullets, which fly in all directions upon its explosion and scatter destruction far and wide. This has become still more the case with the discovery of explosives far surpassing gunpowder in destructive force. To all this must be added the much greater range of recent guns, some of the siege guns of to-day being credited with a range of twenty miles with shells a ton in weight.

One of the artillery surprises of the Great war was the 42-centimeter howitzer used by the German army. Up till its introduction it was supposed that the heaviest guns in the German siege trains were the 28-centimeter (11-inch) howitzers. These were mounted on specially constructed carriages whose wheel pressure on the roadway was brought within safe limits by wide plates fastened to the wheels.

There was an extraordinary number of heavy guns used in the European war. The artillery was rather an enormous siege train than a manœuvring force, such as all sides employed at the beginning of the war. The corps' artillery was almost submerged in the heavy ordnance, which often played a most decisive part in a battle. It has been estimated that in an army of a million men there were more than a quarter of a million artillerymen. In the first stage of the attack on Verdun in 1916 the Germans used three million shells. A fifth of these were for heavy guns from 6-in. to 16.8-in., and with the lighter shells of the quick-firers the total weight of the projectiles was 47,000 tons.

It was in 1916 that the doctrine of 'curtain' fire was first heard. The object of the so-called *tir de barrage* is to keep a belt of ground smothered in shells, so that the enemy shall pay a heavy toll in passing it. See *Coast Artillery, Field Artillery, Howitzer, Mortar, Cannon, Gun, Machine-Gun, Anti-aircraft Gun.*

Artillery Company, THE HONORABLE, the oldest existing body of volunteers in Great Britain, instituted in 1537; revived in 1610. It comprises six companies of infantry, besides artillery, grenadiers, light infantry, and yagers, and furnishes a guard of honor to the sovereign when visiting London.—THE ANCIENT AND HONORABLE ARTILLERY COMPANY of Boston, Mass., copied from that of London, was formed in 1637; was the first regularly organized military company in America.

Artiodactyla (Ar-ti-ō-dak'ti-la; Gr. *artios*, even numbered, *daktylos*, a finger or toe), a section of the Ungulata or hoofed mammals, comprising all those in which the number of the toes

is even (two or four), including the chief residence of the Dukes of Norfolk, ruminants, such as the ox, sheep, deer, stands on a knoll on the northeastern side etc., and also a number of non-ruminating of the town. Pop. 2842.

Artocarpes (ăr-to-kar'pe-s) a natural order of plants, the bread-fruit order, by some botanists ranked as a sub-order of the *Urticaceae* or nettles. They are trees or shrubs, with a milky juice, which in some species hardens into caoutchouc, and in the cow-tree (*Brosimum Galactodendron*) is a milk said to be as good as that of the cow. Many of the plants produce an edible fruit, of which the best known is the bread-fruit (*Artocarpus*).

Artois (ăr-twā), a former province of France, anciently one of the seventeen provinces of the Netherlands, now almost completely included in the department of Pas de Calais.

Arts, the name given to certain branches of study in the middle ages, originally called the 'liberal arts' to distinguish them from the 'servile arts' or mechanical occupations. These arts were usually given as grammar, dialectics, rhetoric, music, arithmetic, geometry, and astronomy. Hence originated the terms 'art classes,' 'degrees in arts,' 'Master of Arts,' etc., still in common use in universities, the faculty of arts being distinguished from those of divinity, law, medicine, or science.

Artyk (ăr-t'vên'), a Russian town, in the Caucasus, about 35 m. inland from Batoum. Pop. 7850.

Aruba (ăr-rū'bā), an island off the north coast of Venezuela, belonging to Holland (a dependency of Guayana), about 30 m. long and 7 broad; surface generally rock, quartz being abundant, and containing considerable quantities of gold; a phosphate which is reported for manure is also abundant. The climate is healthy. Pop. 9349.

Aru Islands. See *Arru Islands*.

Arum (ăr'rum), a genus of plants, nat. order *Araceae*. *A. maculatum* (the common wakerobin, or lords-and-ladies) is abundant in woods and hedges in England and Ireland. It has acrid properties, but its corm yields a starch, which is known by the name of Portland sago or arrow-root. Indian turnip, or jack-in-the-pulpit, resembling plants of the genus *Arum*, is common in the United States; fruit, a bunch of bright scarlet berries.

Arundel (ăr'un-del), a town in Sussex, England, on the river Arun, 4 miles from its mouth, the river being navigable to the town for vessels of 250 tons. The castle of Arundel, the



Cuckoo-pint or Wake-robin (*Arum maculatum*).—a, Spadix. b b, Stamens or male flowers. c, Ovaries or female flowers. d, Spathe or sheath. e, Corm.

Arundel, THOMAS, third son of Richard Fitz-Alan, Earl of Arundel, born 1353; died 1414. He was chancellor of England and Archbishop of Canterbury. He concerted with Bolingbroke to deliver the nation from the oppression of Richard II, and was a bitter persecutor of the Lollards, the followers of Wickliffe.

Arundelian Marbles, a series of sculptured marbles discovered by an expedition, which explored the ruins of Greece at the expense of and for Thomas Howard, Earl of Arundel, who lived in the time of James I and Charles I and was a liberal patron of scholarship and art. After the Restoration they were presented by the grandson of the collector to the University of Oxford. Among them is the Parian Chronicle, a chronological account of the principal events in Grecian and particularly in Athenian history during a period from the reign of the legendary Cecrops, first King of Athens, to the archonship of Diognetus (B.C. 284).

Arundo (ăr-un'dō), a genus of grasses now usually limited to the *A. donax* and the species which most nearly agree with it, commonly called reeds. *A. donax* is a native of the south of Europe, Egypt, and the East. It is one of the largest grasses in cultivation, and attains a height of 9 or 10 feet, or even more. Its canes or stems are used for fishing-rods, etc.

Aruspices (ăr-us'pi-sēs), *ARUSPICES*, a class of priests in ancient Rome, of Etrurian origin, whose business was to inspect the entrails of victims killed in sacrifice, and by them to foretell future events.

Aruwimi (ár-d-wé'má), a large river of equatorial Africa, a tributary of the Congo, which it enters from the north. It was first explored by Stanley, during his famous forest journey.

Arval Brothers (*Fratres Arvales*), a college or company of twelve members elected for life from the highest ranks in ancient Rome, so called from offering annually public sacrifices for the fertility of the fields (*L. arvum*, a field).

Arve (árv), a river rising in the Savoyan Alps, passes through the valley of Chamouni, and falls into the Rhone near Geneva, after a course of about 50 miles.

Arvicola (ár-vik'o-la), a genus of rodent animals, sub-order *Merida* or *Mice*. *A. amphibius* is the water-vole or water-rat, and *A. agrestis* is the field-vole or short-tailed field-mouse.

Aryan (ár'yan, ár'i-an), or INDO-EUROPEAN FAMILY OF LANGUAGES. See *Indo-European Family*.

Arzamas. See *Arsamas*.

As, a Roman weight of 12 ounces, answering to the libra or pound, and equal to 5028 grains, or 325.8 grams.

In the most ancient times of Rome the copper or bronze coin which was called *as* actually weighed an *as*, or a pound, but in 264 B.C. it was reduced to 2 oz., in 217 to 1 oz., and in 191 to 1/2 oz.



As (half real size).—Specimen in British Museum.

Asa (á'sa), great-grandson of Solomon and third king of Judah; he ascended the throne at an early age, and distinguished himself by his zeal in rooting out idolatry with its attendant immoralities. He died after a prosperous reign of forty-one years, about 877 B.C. See I Kings xv: 9-24; II Chron. xiv-xvi.

Asafetida, ASAFOETIDA (as-a-fet'i-da, as-a-fé'ti-da), a fetid inspissated sap from Central Asia, the solidified juice of the *Narthes asafetida*, a large umbelliferous plant. It is used in medicine as an antispasmodic, and in cases of flatulency, in hysteric paroxysms, and other nervous affections. Notwithstanding its very disagreeable odor it is used as a seasoning in the East, and sometimes in Europe. An inferior sort is the product of certain species of *Ferula*.

Asama (á-sá'má), an active volcano of Japan, about 50 miles north-west of Tokio, 8260 feet high.

Asaph (á'sáf), a Levite and psalmist appointed by David as leading chorister in the divine services. His office became hereditary in his family, or he founded a school of poets and musicians, which were called, after him, 'the sons of Asaph.'

Asaph, Str., a small cathedral city and bishop's see in Wales, 15 miles west of Flint; founded about 550 by St. Kentigern or St. Mungo, Bishop of Glasgow, and named after his disciple St. Asaph, from whom both the diocese and town took their name. The cathedral was built about the close of the fifteenth century; it consists of a choir, a nave, two aisles, and a transept. Pop. 6170.

Asarabacca (a-sa-ra-bák'a), a small hardy European plant, nat. order *Aristolochiaceae* (*Asarum Europæum*). Its leaves are acrid, bitter, and nauseous, and its root is extremely acrid. Both the leaves and root were formerly used as an emetic. The species *A. Canadense*, the Canada snake-root, is found in the Western States.

As'arum. See *Asarabacca*.

As'ben, AIB, or A'HIB, a kingdom of Africa, in the Sahara, between lat. 16° 15' and 20° 15' N., and lon. 6° 15' and 9° 30' E. It consists of a succession of mountain groups and valleys, with a generally western slope, and attains in its highest summits a height of over 5000 feet. The valleys, though separated by complete deserts, are very fertile, and often of picturesque appearance. The inhabitants are Tuaregs or Berbers, with an admixture of negro blood. They live partly in villages, partly as nomads. It is nominally ruled over by a sultan, who resides in the capital, Agades.

Asbestos (as-bes'tus), a remarkable and highly useful mineral, a fibrous variety of several members of the hornblende family, composed of separable filaments with a silky luster. The fibers are sometimes delicate, flexible, and elastic; at other times stiff and brittle. It is incombustible, and anciently was wrought into a soft, flexible cloth, which was used as a shroud for dead bodies. In modern times it has been manufactured into incombustible cloth, gloves, felt, paper, etc., is employed in gas-stoves; is much used as a covering to steam boilers and pipes; is mixed with metallic pigments, and used as a paint on wooden structures, roofs, partitions, etc., to render them fireproof, and is employed in various

other ways, the manufacture having recently greatly developed. Some varieties are compact and take a fine polish, others are loose, like flax or silky wool. *Light-form asbestos*, or *mountain-wood*, is a variety presenting an irregular filamentous structure, like wood. *Rock-cork*, *mountain-leather*, *fossil-paper*, and *fossil-flax* are varieties. Asbestos is found in many parts of the world, chiefly in connection with serpentine. Canada has long been an important producing field and has supplied the United States until recently, but much is now being obtained from Vermont and Georgia.

Asbjörnsen (as'byeurn-sen), PETER KRISTEN, born in 1812, died in 1885, a distinguished Norwegian naturalist and collector of the popular tales and legends, fairy stories, etc., of his native country.

Asbury (as'ber-l) PARK, a town on the coast of New Jersey, 50 miles from New York, a great pleasure resort, handsomely built, with wide streets. Pop. 10,150; summer, 50,000.

Ascalon (as'ka-lon; anciently *Ashkelon*), a ruined town of Palestine, on the sea-coast, 40 miles w. s. w. of Jerusalem. It was occupied by the Crusaders under Richard I after a great battle with Saladin (1192).

Ascanius (as-ka'ni-us), the son of Aeneas and Creusa, and the companion of his father in his wanderings from Troy to Italy.

Ascaris (as'ka-ris), a genus of intestinal worms. See *Nemathelminthes*.

Ascension (a-sen'shun; discovered on Ascension Day), an island of volcanic origin belonging to Britain, near the middle of the South Atlantic Ocean, 800 miles northwest of St. Helena; area, about 36 square miles; pop. about 400. It is retained by Britain mainly as a station at which ships may touch for stores. It is celebrated for its turtle, which are the finest in the world. Wild goats are plentiful, and oxen, sheep, pheasants, Guinea fowl, and rabbits have been introduced and thrive well. Georgetown, the seat of government, stands on the west side of the island, which is governed under the admiralty by a naval officer.

Ascension, RIGHT, of a star, in astronomy the arc of the equator intercepted between the first point of Aries and that point of the equator which comes to the meridian at the same instant with the star.

Ascension Day, the day on which the ascension of the Saviour is commemorated, often called

Holy Thursday: a movable feast, always falling on the Thursday but one before Whitmonday.

Ascetics (a-set'iks), a name given in ancient times to those Christians who devoted themselves to severe exercises of piety and strove to distinguish themselves from the world by abstinence from sensual enjoyments and by voluntary penances. Ascetics and asceticism have played an important part in the Christian church, but the principle of striving after a higher and more spiritual life by subduing the animal appetites and passions has no necessary connection with Christianity. Thus there were ascetics among the Jews previous to Christ, and asceticism was inculcated by the Stoics, while in its most extreme form it may still be seen among the Brahmins and Buddhists. Monasticism was but one phase of asceticism.

Asch (ash), a town of Austria-Hungary, in the extreme northwestern corner of Bohemia, with manufactures of cotton, woolen, and silk goods, bleach-fields, dye-works, etc. Pop. 18,700.

Aschaffenburg (a-shaf'en-lörk), a town of Bavaria, on the Main and Aschaff, 25 miles N. E. of Frankfort. The chief edifice is the castle of Johannisberg, built in 1605-14, and for centuries the summer residence of the elector. There are manufactures of colored paper, tobacco, liquors, etc. Pop. (1905) 25,275.

Ascham (as'kam), ROGER, a learned Englishman, born in 1515 of a respectable family in Yorkshire, died 1568. He was entered at Cambridge, 1530, and was chosen fellow in 1534 and tutor in 1537. He became Latin secretary to Edward VI and also to Mary. Was preceptor to Elizabeth during her girlhood and her secretary after she ascended the throne. In 1544 he wrote his *Tormentilus*, or *School of Shooting*, in praise of his favorite amusement and exercise—archery. In 1563-68 he wrote his *Schoolmaster*, a treatise on the best method of teaching children Latin. Some of his writings, including many letters, were in Latin. He wrote the best English style of his time. His life was written by Dr. Johnson to accompany an edition of his works published in 1769.

Aschersleben (ash'ers-lä-ben), a town of Prussian Saxony, in the district of Magdeburg, near the junction of the Elbe with the Wipper. Industries: woollens, machinery and metal goods, beet sugar, paper, etc. Pop. 29,000. It fell to Brandenburg in 1648 and was part of the kingdom of Westphalia, 1807-13.

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Ascidia

Ascidia (a-sid'i-a; Greek, *aschos*, a wine-skin), the name given to the 'sea-squirts' or main section of the Tunicata, molluscous animals of low grade, resembling a double-necked bottle, of a leathery or gristly nature, found at



Ascidian

A, mouth; B, vent; C, intestinal canal; D, stomach;
E, common tubular stem.

low-water mark on the sea-beach, and dredged from the deep water attached to stones, shells, and fixed objects. One of the prominent openings admits the food and the water required in respiration; the other is the excretory aperture. A single ganglion represents the nervous system, placed between the two apertures. Male and female reproductive organs exist in each ascidian. They pass through peculiar phases of development, the young ascidian appearing like a tadpole-body. They may be single or simple, social or compound. In social ascidians the peduncles of a number of individuals are united into a common tubular stem, with a partial common circulation of blood. In these animals evolutionists see a link between the Mollusca and the Vertebrata.

Asclepiadaceæ (as-klē-pi-a-d-ā'ce-ā), an order of gamopetalous exogenous plants, the distinguishing characteristic of which is that the anthers adhere to the five stigmatic processes, the whole sexual apparatus forming a single mass. The members of this order are shrubs, or sometimes herbaceous plants, occasionally climbing, almost always with a milky juice. Many of them are employed as purgatives, diaphoretics, tonics, and febrifuges, and others as articles of food. *Asclepias* is the typical genus. See articles, *Asclepias* and *Calotropis*.

Asclepiades (as-klē-pi'ā-dēs), the name of a number of ancient Greek writers—poets, grammarians, etc.,—of whom little is known, and also of

several ancient physicians, the most celebrated of whom was ASCLEPIADES, of Bithynia, who acquired considerable repute at Rome about the beginning of the first century B. C.

Asclepias (as-klē'pi-as), or SWALLOW-WORT, a genus of plants, the type and the largest genus of the nat. order Asclepiadaceæ. Most of the species are North American herbs, having opposite, alternate, or verticillate leaves. Many of them possess powerful medicinal qualities. *A. decumbens* is diaphoretic and sudorific, and has the singular property of exciting general perspiration without increasing in any sensible degree the heat of the body; *A. curassavica* is emetic, and its roots are frequently sold as *Ipecacuanha*. The roots of *A. tuberosa* are famed for diaphoretic properties.

Ascoli (āsk'o-li), or ASCOLI PICENO (anc. *Asculum*), a town in Middle Italy, capital of the province of the same name, on the Tronto. Pop. 12,583.—The province has an area of 800 sq. miles; a pop. of 243,883.

Ascoli Satriano (anc. *Asculum Apulum*), a town of S. Italy, prov. Foggia. Here Pyrrhus defeated the Romans in 279 B. C. Pop. 8550.

Ascomycetes (as-kō-mi-sē'tēs), a large group of fungi, so called from their spores being contained in asci or sacs.

Asconius (as-kō'ni-us; QUINTUS A. PEDIANUS), a Roman writer of the first century after Christ, who wrote the life of Ballust, a reply to the detractors of Virgil, and commentaries to Cicero's orations, some of which are extant.

As'cot, an English race-course adjacent to the S. W. extremity of the great park of Windsor.

Asepsis (a-sep'sis), the neutral condition in which there are neither bacteria nor any active antiseptic agents. Water that has boiled for half an hour in a covered vessel is aseptic, but is not antiseptic until an antiseptic has been added. Asepsis is the ideal condition for the treatment of a wound, and the less antiseptic required, the better. See *Antiseptic*.

As'gard (lit. gods' yard, or abode), in Scandinavian mythology the home of the gods or *Æsir*, rising like the Greek Olympus, from *midgard*, or the middle world, that is, the earth. It was here that Odin and the rest of the gods, the twelve *Æsir*, dwelt—the gods in the mansion called Gladsheim, the goddesses dwelling in Vingulf. Walhalla, in which heroes slain in battle dwelt, was

also here. Below the boughs of the ash-tree Yggdraill the gods assembled every day in council.

Asgill (as'gill), JOHN, an eccentric English writer, a lawyer by profession; born 1659; died 1738. In 1696 he published a pamphlet to prove that Christians were not necessarily liable to death, death being the penalty imposed for Adam's sin and Christ having satisfied law. Having crossed over to Ireland, he was beginning to get into a good practice, and was elected to the Irish House of Commons, when his pamphlet was ordered to be burned by the public hangman, and he himself was expelled from the house. His whole subsequent life was passed in pecuniary and other troubles, mainly in the Fleet or within the rules of the King's Bench.

Ash (*Fraxinus*), a genus of deciduous trees belonging to the nat. order Oleaceae, having imperfect flowers and a seed-vessel prolonged into a thin wing at the apex (called a samara). There are a good many species, chiefly indigenous to Europe and North America. The common ash (*F. excelsior*), indigenous to Britain, has a smooth bark, and grows tall and rather slender. It is one of the most useful of British trees on account of the excellence of its hard, tough wood and the rapidity of its growth. There are many varieties of it, as the weeping-ash, the curled-leaved ash, the entire-leaved ash, etc. The flowering or manna ash (*F. Ornus*), by some placed in a distinct genus (*Ornus*), is a native of the south of Europe and Palestine. It yields the substance called manna, which is obtained by making incisions in the bark, when the juice exudes and hardens. Among American species are the white ash (*F. Americana*), with lighter bark and leaves; the red or black ash (*F. pubescens*), with a brown bark; the black ash (*F. sambucifolia*), the blue ash, the green ash, etc. They are all valuable trees. The mountain-ash or rowan belongs to a different order.

Ash, ASHES, the incombustible residue of organic bodies (animal or vegetable) remaining after combustion; in common usage, any incombustible residue of bodies used as fuel; as a commercial term, the word generally means the ashes of vegetable substances, from which are extracted the alkaline matters called potash, pearl-ash, kelp, barilla, etc.

Ashango (ash-an'gō), a region in the interior of Western Africa, in French Congo, partly mountainous, partly in the basin of the Ogowai River. The inhabitants belong to the Bantu

stock, and among them are a dwarfish people, the Oborgo, a branch of the African Pygmies.

Ashantee (ash-an'ts), a kingdom of West Africa, in the interior of the Gold Coast, and to the north of the river Prae, with an area of about 23,000 sq. miles. It is in great part hilly, well watered, and covered with dense tropical vegetation. The country round the towns, however, is carefully cultivated. The crops are chiefly rice, maize, millet, sugar-cane, and yams, the last forming the staple vegetable food of the natives. The domestic animals are cows, horses of small size, goats and a species of hairy sheep. The larger wild animals are the elephant, rhinoceros, giraffe, buffalo, lion, hippopotamus, etc. Birds of all kinds are numerous, and crocodiles and other reptiles abound. Gold is abundant, being found either in the form of dust or in nuggets. The Ashantees, formerly warlike and ferocious, with a love of shedding human blood and of making human sacrifices, are now seemingly of peaceful disposition. They make excellent cotton cloths, articles in gold, and good earthenware, tan leather, and make sword-blades of superior workmanship. The chief town is Coomassie, which, before being burned down in 1874, was well and regularly built with wide streets, and had from 70,000 to 100,000 inhabitants. The British first came in contact with the Ashantees in 1807, and hostilities continued off and on till 1826, when the natives were driven from the sea-coast. Immediately after the transfer of the Dutch settlements on the Gold Coast to Britain in 1872—when the entire coast remained in British hands—the Ashantees reclaimed the sovereignty of the tribes round the settlement of Elmina. This brought on a sanguinary war, leading to a British expedition in 1874, in which Coomassie was captured, and British supremacy established along the Gold Coast. Ashantee was made a British protectorate in 1893 and annexed to Great Britain, 1901. Pop. 500,000.

Ashborne, a town in Derbyshire, England, land, on the Dove. It has a church dating from 1241. Pop. 4039.

Ashburner, CHARLES ALBERT, American geologist, born in Philadelphia 1854; died 1889. His work in the Pennsylvania coal fields is of great value to science.

Ashburton, a town in New Zealand, on the left bank of the Ashburton River, 53 miles s. of Christchurch. Pop. 6000.

Ashburton ALEXANDER BARING, LORD, a British states-

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man and financier, born 1774; died 1848. A younger son of Sir Francis Baring, he was bred to commercial pursuits, and in 1810 he became head of the great firm of Baring Brothers & Co. After serving in Parliament for many years and being a member of Peel's government (1834-35), he was raised to the peerage in 1835. See next article.

Ashburton Treaty, a treaty concluded at Washington, 1842, by Alexander Baring, Lord Ashburton, and the President of the United States; it defined the boundaries between the States and Canada, etc.

Ashby-de-la-Zouch (ash'bī-dē-lā-zōch'), a town in Leicestershire, England, on the borders of Derbyshire, with manufactures of hosiery, leather, etc. Pop. 4927.

Ashdod (ash'dod), a place on the coast of Palestine, formerly one of the chief cities of the Philistines, now an insignificant village.

Asheville (ash'vill), county seat of Buncombe Co., in the Blue Ridge mountains of western North Carolina; is the center of a farming district. Industries include quilt and cotton mills; box and furniture factories; sewer pipe and other plants; tannery, foundry and machine shops. Pop. 18,762.

Asherā (a-shē'ra), an ancient Semitic goddess, whose symbol was the phallus. In the Revised Version of the Old Testament this word is used to translate what in the ordinary version is translated 'grove,' as connected with the idolatrous practices into which the Jews were prone to fall.

Ash'es. See *Ash*.

Ash'ford, a thriving town of England, in Kent, situated near the confluence of the upper branches of the river Stour. It gives name to a parliamentary division of the county. Pop. 13,670.

Ashland, a city of Boyd Co., Kentucky, on the Ohio River, 146 miles east of Cincinnati; is a big iron and lumber center, and has coke, tanning and other industries, and important shipping interests. Pop. 8688.

Ashland, a village of Ohio, county seat of Ashland Co., 50 miles w.s.w. of Akron. Its manufactures include agricultural implements, medicines, pumps, rubber goods, automobile supplies, etc. Pop. 6795.

Ashland, a city, county seat of Jackson Co., Oregon, 16 miles s. e. s. of Jacksonville. It is located in a rich fruit-growing region, and is noted as a watering place. Pop. 5020.

Ash'land, a town of Schuylkill Co., in the anthracite region of Pennsylvania, 12 miles n.w. of Pottsville, and engaged in mining and iron manufacture. Pop. 6855.

Ashland, a city, county seat of Ashland Co., Wisconsin, on Lake Superior. It has farming and fruit growing interests, iron and steel works, saw and planing mills, etc., and ships iron ore and lumber. Pop. 11,594.

Ashley, Lord. See *Shaftesbury, First Earl of*.

Ashmole (ash'mōl), ELIAS, an English antiquary, born 1617; died 1692. He became a chancery solicitor in London, but afterwards studied at Oxford, taking up mathematics, physics, chemistry, and particularly astrology. He published *Theatrum Chymicum* in 1652. On the Restoration he received the post of Windsor herald and other appointments both honorable and lucrative. In 1672 appeared his *History of the Order of the Garter*. He presented to the University of Oxford his collection of rarities.

Ashtabula (ash-tā-bū'la), a city on four railroads in Ashtabula Co., Ohio, 55 miles northeast of Cleveland; contains various industries, including car repair shops, carriage and automobile works, machine shops, tool works, tanneries, iron ore docks and ship-building works, etc. Pop. 18,266.

Ashtaroth (ash'tn-rōth), a goddess worshiped by the ancient Canaanites, and regarded as symbolizing the productive powers of nature, being probably the same as Astarte (which see). *Ashtaroth* is a plural form, the singular being *Ashtoreth*.

Ashton-in-Makerfield, a town of Lancashire, England, 4 miles from Wigan, with collieries, cotton mills, etc. Pop. 21,540.

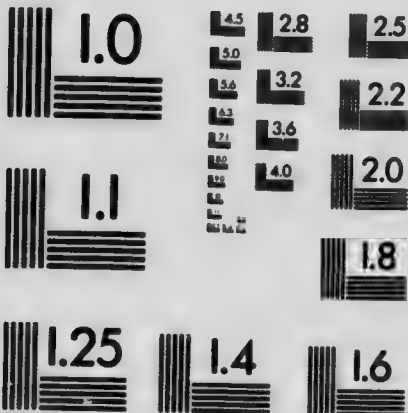
Ashton-under-Lyne, a municipal elementary borough of Lancashire, England, 6 miles e. of Manchester, on the north bank of the river Tame, a well-built place, with handsome streets and public buildings. The chief employment is cotton manufacture, but there are also collieries and iron-works, which employ many persons. Pop. 45,179.

Ash-Wednesday, the first day of from a custom in the Western Church of sprinkling ashes that day on the heads of penitents, then admitted to penance. The period at which the fast of Ash-Wednesday was instituted is uncertain. In the Roman Catholic Church the ashes are now placed on the heads



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of all the clergy and people present. In the Anglican Church Ash-Wednesday is regarded as an important fast day.

Asia (a'sha), the largest of the great divisions of the earth; length, from the extreme southwestern point of Arabia, at the strait of Bab-el-Mandeb, to the extreme northeastern point of Siberia—East Cape, or Cape Vostochni in Bering Strait—6900 miles; breadth, from Cape Chelyuskin, in Northern Siberia, to Cape Romania, the southern extremity of the Malay Peninsula, 5300 miles; area estimated at about 16,000,000 (including the islands 17,000,000), square miles, about a third of all the land of the earth's surface. On three sides, N., E., and S., the ocean forms its natural boundary, while in the W. the frontier is marked mainly by the Ural Mountains, the Ural River, the Caspian Sea, the Caucasus, the Black Sea, the Mediterranean, the Suez Canal, and the Red Sea. There is no proper separation between Asia and Europe, the latter being really a great peninsula of the former. Asia, though not so irregular in shape as Europe, is broken in the S. by three great peninsulas, Arabia, Hindustan, and Indo-China, while the east coast presents peninsular projections and islands, forming a series of sheltered seas and bays, the principal peninsulas being Kamchatka and Corea. The principal islands are those forming the Malay or Asiatic Archipelago, which stretch round in a wide curve on the S. E. of the continent. Besides the larger islands—Sumatra, Java, Borneo, Celebes, Mindanao, and Luzon (in the Philippine group)—there are countless smaller islands grouped round these. Other islands are Ceylon, in the S. of India; the Japanese islands and Sakhalin on the east of the continent; Formosa, S. E. of China; Cyprus S. of Asia Minor; and New Siberia and Wrangell Land, in the Arctic Ocean.

The mountain systems of Asia are of great extent, and their culminating points are the highest in the world. The greatest of all is the Himalayan system, which lies mainly between lon. 70° and 100° E. and lat. 28° and 37° N. It extends, roughly speaking, from northwest to southeast, its total length being about 1500 miles, forming the northern barrier of Hindustan. The loftiest summits are Mount Everest, 29,002 feet high, another peak 28,265, and Kanchinjanga, 28,156. The principal passes, which rise to the height of 18,000 to 20,000 feet, are the highest in the world. A second great mountain system of Central Asia, connected with the northwest-

ern extremity of the Himalayan system by the elevated region of Pamir (about lon. 70°-75° E., lat. 37°-40° N.), is the Thian-Shan system, which runs northeastward for a distance of 1200 miles. In this direction the Altai, Sayan, and other ranges continue the line of elevation to the northeastern coast. A northwestern continuation of the Himalayas is the Hindu Kush, and farther westward a connection may be traced between the Himalayan mass and the Elburz range (18,400 ft.), south of the Caspian, and thence to the mountains of Kurdistan, Armenia, and Asia Minor.

There are vast plateaus and elevated valley regions connected with the great central mountain systems, but large portions of the continent are low and flat. Tibet forms the most elevated tableland in Asia, its mean height being estimated at 15,000 feet. On its south is the Himalayan range, while the Kuen-Lun range forms its northern barrier. Another great but much lower plateau is that which comprises Afghanistan, Beluchistan, and Persia, and which to the northwest joins into the plateau of Asia Minor. The principal plain of Asia is that of Siberia, which extends along the north of the continent and forms an immense alluvial tract sloping to the Arctic Ocean. Vast swamps or peat-mosses called *tundras* cover large portions of this region. Southwest of Siberia, and stretching eastward from the Caspian, is a low-lying tract consisting to a great extent of steppes and deserts, and including in its area the Sea of Aral. In the east of China there is an alluvial plain of some 200,000 square miles in extent; in Hindustan are plains extending for 2000 miles along the south slope of the Himalayas; and between Arabia and Persia, watered by the Tigris and Euphrates, is the plain of Mesopotamia or Assyria, formerly one of the most productive in the world. Of the deserts of Asia, the largest is that of Gobi (lon. 90°-120° E., lat. 40°-48° N.), large portions of which are covered with nothing but sand or display surface of bare rock. An almost continuous desert region may also be traced from the desert of North Africa through Arabia (which is largely occupied by bare deserts), Persia, and Beluchistan to the Indus.

Some of the largest rivers of Asia flow northward to the Arctic Ocean—the Obi, the Yenisei, and the Lena. The Hoang-Ho, the Yang-tse, and the Amoor, are the chief of those which flow into the Pacific. The Ganges, Brahma-

patra, Irawaddy, and Indus, and others of some magnitude empty into the Indian Ocean. The Persian Gulf receives the united waters of the Euphrates and the Tigris. There are several systems of inland drainage, large rivers falling into lakes which have no outlets.

The largest lake of Asia (partly also European) is the Caspian Sea, which receives the Kur from the Caucasus (with its tributary the Aras from Armenia), and the Sefid Rud and other streams from Persia (besides the Volga from European Russia, and the Ural, which is partly European, partly Asiatic). The Caspian lies in the center of a great depression, being 83 feet below the level of the Sea of Azof. East from the Caspian is the Sea of Aral, which, like the Caspian, has no outlet, and is fed by the rivers Amoo Daria (Oxus) and Syr Daria. Still farther east, to the north of the Thian-Shan Mountains, and fed by the Ili and other streams, is Lake Balkash, also without an outlet and very salt. Other lakes having no communication with the ocean are Lob Nor, in the desert of Gobi, receiving the river Tarim, and the Dead Sea, far below the level of the Mediterranean, and fed by the Jordan. The chief fresh-water lake is Lake Baikal, in the south of Siberia, between lon. 104° and 110° E., a mountain lake from which the Yenisei draws a portion of its waters.

Geologically speaking large areas of Asia are of comparatively recent date, the lowlands of Siberia, for instance, having been submerged during the tertiary period, if not more recently. Many geologists believe that subsequently to the glacial period there was a great sea in Western Asia, of which the Caspian and Aral Seas are the remains. The desiccation of Central Asia is still going on, as is also probably the upheaval of a great part of the continent. The great mountain chains and elevated plateaus are of ancient origin, however, and in them granite and other crystalline rocks are largely represented. Active volcanoes are only met with in the extreme east (Kamchatka) and in the Eastern Archipelago. From the remotest times Asia has been celebrated for its mineral wealth. In the Altai and Ural Mountains gold, iron, lead, and platinum are found; in India and other parts rubies, diamonds, and other gems are, or have been, procured; salt in Central Asia; coal in China, India, Central Asia, etc.; petroleum in the districts about the Caspian and in Burmah; bitumen in Syria; while silver, copper, sulphur, etc., are found in various parts.

Every variety of climate may be experienced in Asia, but as a whole it is marked by extremes of heat and cold and by great dryness, this in particular being the case with vast regions in the center of the continent and distant from the sea. The great lowland region of Siberia has a short but hot summer, and a long and intensely cold winter, the rivers and their estuaries being fast bound with ice, and at a certain depth the soil is hard frozen all the year round. The northern part of China to the east of Central Asia has a temperate climate with a warm summer, and in the extreme north a severe winter. The districts lying to the south of the central region, comprising the Indian and Indo-Chinese peninsulas, Southern China, and the adjacent islands, present the characteristic climate and vegetation of the southern temperate and tropical regions modified by the effects of altitude. Some localities in Southeastern Asia have the heaviest rainfall anywhere known. As the equator is approached the extremes of temperature diminish till at the southern extremity of the continent they are such as may be experienced in any tropical country. Among climatic features are the monsoons of the Indian Ocean and the eastern seas, and the cyclones or typhoons, which are often very destructive.

The plants and animals of Northern and Western Asia generally resemble those of similar latitudes in Europe (which is really a prolongation of the Asiatic continent), differing more in species than in genera. The principal mountain trees are the pine, larch, and birch; the willow, alder, and poplar are found in lower grounds. In the central region European species reach as far as the Western and Central Himalayas, but are rare in the Eastern. They are here met by Chinese and Japanese forms. The lower slopes of the Himalayas are clothed almost exclusively with tropical forms. Higher up, between 4000 and 10,000 feet, are found all the types of trees and plants that belong to the temperate zone, there being extensive forests of conifers. Here is the native home of the deodar cedar. The southeastern region, including India, the Eastern Peninsula, and China, with the islands, contains a great variety of plants useful to man and having here their original habitat, such as the sugar-cane, rice, cotton, and indigo; pepper, cinnamon, cassia, clove, nutmeg, and cardamoms; banana, cocoanut, areca and sago palms; the mango and many other fruits, with

plants producing many drugs, also caoutchouc and gutta-percha. The forests of India and the Malay Peninsula contain oak, teak, sal, and other timber woods, besides bamboos, palms, sandal-wood, etc. The palmyra palm is characteristic of Southern India; while the talipot palm flourishes on the western coast of Hindustan, Ceylon, and the Malay Peninsula. The cultivated plants of India and China include wheat, barley, rice, maize, millet, sorghum, tea, coffee, indigo, cotton, jute, opium, tobacco, etc. In North China and the Japanese Islands large numbers of deciduous trees occur, such as oaks, maples, limes, walnuts, poplars and willows, the genera being European, but the individual species Asiatic. Among cultivated plants are wheat, and in favorable situations rice, cotton, the vine, etc. Coffee, rice, maize, etc., are extensively grown in some of the islands of the Asiatic Archipelago. In Arabia and the warmer valleys of Persia, Afghanistan, and Beluchistan aromatic shrubs are abundant. Over large parts of these regions the date-palm flourishes and affords a valuable article of food. Gum-producing acacias are, with the date-palm, the commonest trees in Arabia. African forms are found extending from the Sahara along the desert region of Asia.

Nearly all the mammals of Europe occur in Northern Asia, with numerous additions to the species. Central Asia is the native land of the horse, the ass, the ox, the sheep, and the goat. Both varieties of the camel, the single and the double humped, are Asiatic. To the inhabitants of Tibet and the higher plateaus of the Himalayas the yak is what the reindeer is to the tribes of the Siberian plain, almost their sole wealth and support. The elephant, of a different species from that of Africa, is a native of tropical Asia. The Asiatic lion, which inhabits Arabia, Persia, Asia Minor, Beluchistan, and some parts of India, is smaller than the African species. Bears are found in all parts, the white bear in the far north, and other species in the more temperate and tropical parts. The tiger is the most characteristic of the larger Asiatic carnivora. It extends from Armenia across the entire continent, being absent, however, from the greater portion of Siberia and from the high tableland of Tibet; it extends also into Sumatra, Java, and Bali. In Southeastern Asia and the islands we find the rhinoceros, buffalo, ox, deer, squirrels, porcupines, etc. In birds nearly every order is represented. Among the most interesting forms are

the hornbills, the peacock, the Impey pheasant, the tragopan or horned pheasant, and other gallinaceous birds, the pheasant family being very characteristic of Southeastern Asia. It was from Asia that the common domestic fowl was introduced into Europe. The tropical parts of Asia abound in monkeys, of which the species are numerous. Some are tailed, others, such as the orang, are tailless, but none have prehensile tails like the American monkeys. In the Malay Archipelago marsupial animals, so characteristic of Australia, first occur in the Moluccas and Celebes, while various mammals common in the western part of the archipelago are absent. A similar transition towards the Australian type takes place in the species of birds. Of marine mammals the dugong is peculiar to the Indian Ocean; in the Ganges is found a peculiar species of dolphin. At the head of the reptiles stands the Gangetic crocodile, frequenting the Ganges and other large rivers. Among the serpents are the cobra de capello, one of the most deadly snakes in existence; there are also large boas and pythons besides sea and fresh-water snakes. The seas and rivers produce a great variety of fish. The Salmonidae are found in the rivers flowing into the Arctic Ocean. Two rather remarkable fishes are the climbing perch and the archer-fish. The well-known goldfish is a native of China.

Asia is mainly peopled by races belonging to two great ethnographic types, the Caucasian or fair type, and the Mongolic or yellow. To the former belong the Aryan or Indo-European, and the Semitic races, both of which mainly inhabit the southwest of the continent; to the latter belong the Malays and Indo-Chinese in the S.E., as well as the Mongolians proper (Chinese, etc.), occupying nearly all the rest of the continent. To these may be added certain races of doubtful affinities, as the Dravidians of Southern India, the Cingalese of Ceylon, the Ainos of Yesso, and some diminutive negro-like tribes called Negritos, which inhabit Malacca and the interior of several of the islands of the Eastern Archipelago. The total population is estimated at about 850,000,000, or more than half that of the whole world. A large portion of Asia is under the dominion of European powers. Russia possesses the whole of Northern Asia (Siberia) and a considerable portion of Central Asia, together with a great part of ancient Armenia, on the south of the Caucasus (pop. 16,000,000); Turkey holds Asia Minor, Syria and Palestine, part of Arabia, Mesopotamia, etc.

(pop. 16,000,000); Great Britain rules over India, Ceylon, a part of the Indo-Chinese Peninsula (Upper and Lower Burmah), and several other possessions (pop. 800,000,000); France has acquired a considerable portion of the Indo-Chinese Peninsula, and has one or two other settlements (pop. 18,000,000); while to Holland belong Java, Sumatra, and other islands or parts of islands, and to the United States the Philippines. The chief independent States are the Chinese Empire (pop. over 340,000,000), Japan (pop. 50,000,000), Siam (pop. 6,000,000), Afghanistan (5,000,000), Beluchistan, Persia (pop. 7,000,000), and the Arabian States (3,000,000). The most important of the religions of Asia are the Brahmanism of India, the creeds of Buddha, Confucius, and Lao-tse in China, and the various forms of Mohammedanism in Arabia, Persia, India, etc. Probably more than a half of the whole population profess some form of Buddhism. Several native Christian sects are found in India, Armenia, Kurdistan, and Syria.

Asia is generally regarded as the cradle of the human race. It possesses the oldest historical documents, and, in common with the immediately contiguous kingdom of Egypt, the oldest historical monuments in the world. The Old Testament contains the oldest historical records which we have of any nation in the form of distinct narrative. The period at which Moses wrote was probably 1500 or 1600 years before the Christian era. His and the later Jewish writings confine themselves almost exclusively to the history of the Hebrews; but in Babylonia, as in Egypt, civilization had made great advances long before this time. In China authentic history extends back probably to about 1000 B.C., with a long preceding period of which the names of dynasties are preserved without chronological arrangement. The kingdoms of Assyria, Babylonia, Media, and Persia, alternately predominated in South-western Asia. In regard to the history of these monarchies much light has been obtained from the decipherment of the cuneiform inscriptions. The arms of the Pharaohs extended into Asia, they being followed by a wide Assyrian dominion. From Cyrus (B.C. 559), who extended the empire of Persia from the Indus to the Mediterranean, while his son, Cambyses, added Egypt and Lybia to it, to the conquest of Alexander (B.C. 330), Persia was the dominant power in Western Asia. Alexander's great empire became broken up into separate kingdoms, which were finally absorbed in the

Roman Empire, and this ultimately extended to the Tigris. Soon after the most civilized portions of the three continents had been reduced under one empire the great event took place which forms the dividing line of history, the birth of Christ and the spread of Christianity. In A.D. 226 a protracted struggle began between the newer Persian empire and the Romans, which lasted till the advent of Mohammed and the conquests of the Arabians. Persia was the first great conquest of Mohammed's followers. Syria and Egypt soon fell before their arms, and within forty years of the celebrated flight of Mohammed from Mecca (the *Hejira*), the sixth of the caliphs, or successors of the Prophet, was the most powerful sovereign of Asia. The nomadic tribes of the north next became the dominant race. In 999 Mahmud, whose father, born a Turki slave, became governor of Ghazni, conquered India, and established his rule. The dynasty of the Seljuk Tartars was established in Aleppo, Damascus, Iconium, and Kharism, and was distinguished for its struggles with the Crusaders. Othman, an emir of the Seljuk sultan of Iconium, established the Ottoman Empire in 1300. About 1220 Genghis Khan, an independent Mongol chief, made himself master of Central Asia, conquered Northern China, overran Turkestan, Afghanistan, and Persia; his successors took Bagdad and extinguished the caliphate. In Asia Minor they overthrew the Seljuk dynasty. One of them, Timur or Tamerlane, carried fire and sword over Northern India and Western Asia, defeated and took prisoner Bajazet, the descendant of Othman (1402), and received tribute from the Greek emperor. The Ottoman Empire soon recovered from the blow inflicted by Timur, but Constantinople was taken and the Eastern Empire finally overthrown by the Sultan Mohammed II in 1453. China recovered its independence about 1368 and was again subjected by the Manchu Tartars (1618-45), soon after which it began to extend its empire over Central Asia. Siberia was conquered by the Cossacks on behalf of Russia (1580-84). The same country effected a settlement in the Caucasus about 1786, and during the later nineteenth century made steady advances into Central and Eastern Asia, but was checked by Japan in the early twentieth. The discovery by the Portuguese of the passage to India by the Cape of Good Hope led to their establishment in the coast of the peninsula (1498). They were speedily followed by the Spanish, Dutch, French, and British. The struggle between the last two powers for

the supremacy of India was completed by the destruction of the French settlements (1760-65). France has recently acquired an extensive territory in Indo-China, while Britain is dominant in India and Burmah. At present the forms of government in Asia range from the primitive rule of the nomad sheik to the experimental democracy of China, which became a republic in 1912. Suan-t'ung was the last of the emperors, bringing to a close the Manchu dynasty, which had reigned in China since 1644. Japan remains an absolute monarchy.

Asia, CENTRAL, a designation loosely given to the regions in the center of Asia east of the Caspian, also called Turkestan, and formerly Tartary. The eastern portion belongs to China, the western now to Russia. Russian Central Asia comprises the Kirghiz Steppe (Uralsk, Turgai, Akmolinsk, Semipalatinsk, etc.), and what is now the government-general of Turkestan, besides the territory of the Turkomans, or Transcaspia and Merv. Russia has thus absorbed the old khanate of Khokand and part of Bokhara and Khiva, and controls the vassal territories of Bokhara and Khiva, the southern boundary being the Persian and Afghan frontiers.

Asia Minor, the most westerly portion of Asia, being the peninsula lying west of the Upper Euphrates, and forming part of Asiatic Turkey. It forms an extensive plateau, with lofty mountains rising above it, the most extensive ranges being the Taurus and Anti-Taurus, which border it on the south and southeast, and rise to over 10,000 feet. There are numerous salt and fresh-water lakes. The chief rivers are the Kizil-Irmak (Halys), Sakaria (Sangarius), entering the Black Sea; and the Sarabat (Hermus) and Menderes (Meander), entering the Aegean. The coast regions are generally fertile, and have a genial climate; the interior is largely arid and dreary. Valuable forests and fruit-trees abound. Smyrna is the chief town. *Anatolia* is an equivalent name.

Asiphonata (as-i-son'a-ta), or ASIPHONIDA, an order of lamellibranchiate, bivalve molluscs, destitute of the siphon or tube through which, in the *Siphonata*, the water that enters the gills is passed outwards. It includes the oysters, the scallop-shells, the pearl-oyster, the mussels, and in general the most useful and valuable molluscs.

Askabad (äs-kä-bäd'), capital of the Russian province of Transcaspia, situated on the Transcaspian rail-

way in the Akhal Tekke oasis. It was occupied by Skobelev in Jan., 1881, after the sack of Geok Tepé. Its distance from Merv is 232 miles, from Herat 388 miles, and it has become an active commercial center. Pop. about 25,000.

Askew (as'kü), ANNE, a victim of religious persecution; born 1521; martyred 1546. She was a daughter of Sir William Askew, of Lincolnshire, and was married to a wealthy neighbor named Kyme, who, irritated by her Protestantism, drove her from his house. In London, whither she went probably to procure a divorce, she spoke against the dogmas of the old faith, and being tried was condemned to death as a heretic. Being put to the rack to extort a confession concerning those with whom she corresponded, she continued firm, and was then taken to Smithfield, chained to a stake, and burned.

Askja (äsk'yä), a volcano near the center of Iceland, first brought into notice by an eruption in 1875. Its crater is 17 miles in circumference, surrounded by a mountain ring from 500 to 1000 feet high, the height of the mountain itself being between 4000 and 5000 feet.

Asmannshausen (as'manz-hou-zn), a Prussian village on the Rhine, in the district of Wiesbaden, celebrated for its wine. Many judges prefer the red wine of Asmannshausen to the best Burgundy, but it retains its merits for three or four years only.

Asmodeus, or ASHMEDAI (as-mö'dë us), an evil spirit, who, as related in the book of Tobit, slew seven husbands of Sara, daughter of Raguel, but was driven away into the uttermost parts of Egypt by the young Tobias under the direction of the angel Raphael. Asmodai signifies a desolator, a destroying angel. He is represented in the Talmud as the prince of demons who drove King Solomon from his kingdom.

Asmonæans (as-mo-në'ans), a family of high-priests and princes who ruled over the Jews for about 130 years, from 153 B.C., when Jonathan, son of Mattathias, the great-grandson of Chasmon or Asmonæus, was nominated to the high-priesthood.

Asnières (än-yär), a town on the Seine, a favorite boating resort with the Parisians. Pop. 35,883.

Asoka (a-sö'ka), an Indian sovereign, who reigned 264-227 B.C. over the whole of Northern Hindustan, grandson of Chandragupta or Sandracottus. He embraced Buddhism, and forced his subjects also to become converts. Many

temples and topes still remaining are attributed to him.

Aso'ka (*Jonesia asōka*), an Indian tree, natural order Leguminosae, having a lovely flower, showing orange, scarlet, and bright yellow tints; sacred to the god Siva, and often mentioned in Indian literature.

Asopus (a-sō'pus), the name of several rivers in Greece, of which the most celebrated is in Boeotia.

Asp, **ASPIC** (*Naja*, or *Vipera haje*), a species of viper found in Egypt, resembling the cobra de capello or spectacle-serpent of the East Indies, and having a very venomous bite. When approached or disturbed it elevates its head and body, swells out its neck, and appears to stand erect to attack the aggressor. Hence the ancient Egyptians

believed that the asps were guardians of the spots they inhabited, and the figure of this reptile was adopted as an emblem of the protecting genius of the world. The balancing motions made by it in the endeavor to maintain the erect attitude have led to the employment of the asp as a dancing serpent by the African jugglers. The 'deaf adder that stoppeth her ear' of Psalm lviii, 4, 5, is translated asp in the margin, and seems to have been this species. Cleopatra is said to have committed suicide by means of an asp's bite, but the incident is generally associated with the Cerastes or horned viper, not with the haje. The name asp is also given to a viper (*Vipera aspis*) common on the continent of Europe.



Asp, from ancient Egyptian monument.

Asparagus (as-par'a-gus; *Asparagus officinalis*), a plant of the order Liliaceae, the young shoots of which, cut as they are emerging from the ground, are a favorite culinary vegetable. In Greece, and especially in the southern steppes of Russia and Poland, it is found in profusion; and its edible qualities were esteemed by the ancients. It is mostly boiled and served without admixture, and eaten with butter and salt. It is usually raised from seed; and the plants should remain three years in the ground before they are cut; after which, for ten or twelve years, they will continue to afford a regular annual supply. The beds are protected by straw or litter in winter. Its diuretic properties are ascribed to the presence of a crystalline substance found also in the potato, lettuce, etc.

Aspasia (as-pā'she-a), a celebrated lady of ancient Greece, was born at Miletus, in Ionia, but passed a great part of her life at Athens, where her house was the general resort of the most distinguished men in Greece. She won the affection of Pericles, who united himself to Aspasia as closely as was permitted by the Athenian law, which declared marriage with a foreign woman illegal. Her power in the State has often been exaggerated, but it is beyond question that her genius left its mark upon the administration of Pericles. In 432-1 B.C. she was accused of impiety, and was only saved from condemnation by the eloquence and tears of Pericles. After his death (B.C. 429) Aspasia is said to have attached herself to a wealthy but obscure cattle-dealer of the name of Lysicles, whom she raised to a position of influence in Athens. Nothing more is known of her life. She had a son by Pericles, who was legitimated (B.C. 430) by a special decree of the people.

Aspe (as'pā), a town of southern Spain, prov. of Alicante. There are fine vineyards and noted marble quarries in its vicinity. Pop. 7927.

As'pect, in astrology, denotes the situation of the planets with respect to each other. There are five principal aspects: the sextile, when the planets are 60° distant; quartile, when they are 90° distant; trine, when 120° distant; opposition, when 180° distant; and conjunction, when both are in the same degree. The aspects were classed by astrologers as *benign*, *malignant*, or *indifferent*.

As'pen, or trembling poplar (*Populus tremula*), a species of poplar indigenous to most mountainous regions throughout Europe and Asia. It is a beautiful tree of rapid growth and extremely hardy, with nearly circular toothed leaves, smooth on both sides, and attached to footstalks so long and slender as to be shaken by the slightest wind; wood light, porous, soft, and of a white color, useful for various purposes.

Aspen, a city, capital of Pitkin Co., Colorado, 35 miles W. by S. of Leadville, center of a rich silver and lead mining district. Pop. 1834.

Aspergillus (as-per-jil'us), the brush used in Roman Catholic churches for sprinkling holy water on the people. It is said to have been originally made of hyssop.

Aspern and Easslingen (or Ess-LING) (es'ling-en), two villages east of Vienna

and on the opposite bank of the Danube; celebrated as the chief contested positions in the bloody but undecisive battle fought between the Archduke Charles and Napoleon I, May 21 and 22, 1809, when it was estimated that the Austrians lost a third of their army, and the French no less than half.

Asperula (as-per'ū-lā), the woodruff genus of plants.

Asphalt, Asphaltum (as'falt, as-fal'tum), the most common variety of bitumen; also called mineral pitch. Asphalt is a compact, glossy, brittle, black or brown mineral, which breaks with a polished fracture, melts easily with a strong pitchy odor when heated, and when pure burns without leaving any ashes. It is found in the earth in many parts of Asia, Europe, and America, and in a soft or liquid state on the surface of the Dead Sea, which from this circumstance was called *Asphaltites*. It is of organic origin, the asphalt of the great Pitch Lake of Trinidad being derived from bituminous shales, containing vegetable remains in the process of transformation. Asphalt is produced artificially in making coal-gas. During the process much tarry matter is evolved and collected in retorts. If this be distilled, naphtha and other volatile matters escape, and asphalt is left behind. It is used for various purposes, very largely for street making in the cities of America and Europe.

Asphalt Rock, a limestone impregnated with bitumen, found in large quantities in various localities in Europe and America. It contains a variable quantity of bitumen (from 7 or 8 to 20 or 30 per cent.) naturally diffused through it. The Val de Travers asphalt, of Switzerland, was discovered in 1710. Since then other asphalt rocks, as well as artificial preparations made by mixing bitumen, gas-tar, pitch, or other materials, with sand, chalk, etc., have been brought into competition with it.

Asphodel (as'fō-del; *Asphodēlus*), a genus of plants, order Liliaceae, consisting of perennials, with fasciculated fleshy roots, flowers arranged in racemes, six stamens inserted at the base of the perianth, a sessile almost spherical ovary with two cells, each containing two ovules; fruit a capsule with three cells, in each of which there are, as a rule, two seeds. They are fine garden plants, native of Southern Europe. The king's spear, *A. luteus*, has yellow flowers, blossoming in June. *Asphodēlus ramōsus*, which attains a height of 5 feet, is cultivated in Algeria and elsewhere, its tubercles yielding a very pure alcohol, and the

residue, together with the stalks and leaves, being used in making pasteboard and paper. The asphodel was a favorite plant among the ancients, who were in the habit of planting it round their tombs.

Asphyxia (as-fik'si-a), literally, the state of a living animal in which no pulsation can be perceived, but the term is more particularly applied to a suspension of the vital functions from causes hindering respiration. The normal accompaniments of death from asphyxia are dark fluid blood, a congested brain and exceedingly congested lungs, the general engorgement of the viscera, an absence of blood from the left cavities of the heart while the right cavities and pulmonary artery are gorged. The restoration of asphyxiated persons has been successfully accomplished at long periods after apparent death. The attempt should be made to maintain the heat of the body and to secure the inflation of the lungs as in the case of the apparently drowned.

Aspic (as'pik), a dish consisting of a clear savory meat jelly, containing fowl, game, fish, etc.

Aspidium (as-pid'i-um), a genus of ferns, natural order Polypodiaceae, comprising the shield-fern and male-fern.

Aspinwall (as'pin-wal). See *Colon*.

Aspirate (as'pi-rāt), a name given to any sound like our *h*, to the letter *h* itself, or to any mark of aspiration, as the Greek *spiritus asper*, or sounds as the Sanskrit *kh*, *gh*, *bh*, and rough breathing ('or'). Such characters as the Gr. *ch*, *th*, *ph*, are called *aspirates*.

Aspirator (as'pi-rā-tor), an instrument used to promote the flow of a gas from one vessel into another by means of liquid. The simplest form of aspirator is a cylindrical vessel containing water, with a pipe at the upper end which communicates with the vessel containing the gas, and a pipe at the lower end also, with a stopcock and with its extremity bent up. By allowing a portion of the water to run off by the pipe at the lower part of the aspirator a measured quantity of air or other gas is sucked into the upper part.

Asplenium (as-plē'ni-um), a genus of ferns, of the natural order Polypodiaceae. Several are natives of the United States. The dwarf spleenwort is a very beautiful little fern.

Aspromonte (as-pro-montē), a mountain of Italy in the southwest of Calabria, where Garibaldi was wounded and taken prisoner

Aspropotamo

Assam

with greater part of his army, in August, 1892.

Aspropotamo. See *Achelous*.

Asquith, HERBERT HENRY, British statesman, born at Morley, England, in 1852; educated at Oxford; became a barrister, and was elected to Parliament for East Fife in 1886; Secretary of State for Home Department 1892-95; arbitrated the strike of the London cabmen in 1893. He ably advocated the free trade policy in opposition to Chamberlain in 1903; in 1905 became Chancellor of the Exchequer in the Campbell-Bannerman cabinet, and on the resignation of the premier, April 5, 1908, Mr. Asquith succeeded as premier. The chief events of his government were the advocacy and adoption of old age pensions and the financial scheme of taxation of the estates of the nobility which led to the defeat of the House of Lords and the taking from this branch of the Parliament its power of vetoing bills passed by the Commons. After the beginning of the Great war, in 1914, Mr. Asquith held office as premier till December, 1916, when, following a storm of criticism on the conduct of the war, he resigned office. David Lloyd George succeeded him.

Asrael (as'ra-el), the Mohammedan angel of death, who takes the soul from the body.

Ass (*Equus asinus*), a species of the horse genus, supposed by Darwin to have sprung from the wild variety (*Asinus taniopus*) found in Abyssinia; by some writers to be a descendant of the *ondger* or wild ass, inhabiting the mountainous deserts of Tartary, etc.; and by others to have descended from the *hiang* or *djigetai* (*A. hemionus*) of southwestern Asia. Both in color and size the ass is exceedingly variable, ranging from dark gray and reddish brown to white, and from the size of a Newfoundland dog in North India to that of a good-sized horse. In the southwestern countries of Asia and in Egypt, in some districts of Southern Europe, as in Spain, and in Kentucky and Peru, great attention has been paid to selection and interbreeding, with a result no less remarkable than in the case of the horse. Thus in Syria there appear to be four distinct breeds; a light and graceful animal used by ladies, an Arab breed reserved for the saddle, an ass of heavier build in use for plowing and draft purposes, and the large Damascus breed. The efforts made to raise the deteriorated British breed have been only partially successful. The male ass is mature at two years of age, the female still earlier. The she-ass carries her young eleven months. The teeth of the young ass follow the same order of ap-

pearance and renewal as those of the horse. The life of the ass does not usually exceed thirty years. It is in general much healthier than the horse, and is maintained in this condition by a smaller quantity and coarser quality of food; it is superior to the horse in its ability to carry heavy burdens over the most precipitous roads, and it is in no respect its inferior in intelligence, despite the reputation for stupidity which it has borne from very ancient times. The skin is used as parchment to cover drums, etc., and in the East is made into shagreen. The hybrid offspring of the horse and the female ass is the hinny, that of the ass and the mare is the mule; but the latter is by far the larger and more useful animal. Asses' milk has long been celebrated for its sanative qualities. It contains more sugar of milk and less caseine than that of the cow and is especially valuable for persons with weak digestions. The ass is familiarly known in the United States and Britain as the donkey.

Assab (as-sab'), a bay in Africa, studded with islands, on the southwest coast of the Red Sea. Here is an Italian station and settlement declared a colony and free port by Italy on January 9th, 1881.

Assafoetida. See *Asafetida*.

Assai-palm (as'-i; *Euterpe oleracea*), a native of tropical S. America, only about 4 inches in diameter and 60 or 80 feet high, with a crown of leaves, beneath which a small fruit grows on branched horizontal spadices. The pulp of the fruit mixed with water is used as a beverage.

Assal (as-sal'), a salt lake in north-eastern Africa, in Adal.

Assam (as-sam'), a chief commissionership or province of British India, on the northeast border of Bengal, bounded on the north by the Himalayas, on the east and south mainly by Burmah; area, 49,004 square miles. It forms a series of fertile valleys watered by the Brahmaputra and its tributaries, the valley of the Brahmaputra, which is the main one, consisting of rich alluvial plains, either but little elevated above the river or so low that large extents of them are flooded for three or four days once or twice in the year, while the course of the river often changes. The climate is marked by great humidity, and malarious diseases are common in the low grounds; otherwise it is not unhealthy. The whole province, except the cultivated area, may be designated as forest, the trees including teak, sal, sissoo, the date and

sago palms, the areca palm (the betel-nut tree), the Indian fig-tree, etc. The article of most commercial importance is tea. Rice is the principal food crop, and other crops are Indian corn, pulse, oil-seeds, sugar-cane, hemp, jute, potatoes, etc. In the jungles and forests roam herds of elephants, the rhinoceros, tiger, buffalo, leopard, bear, wild hog, jackal, fox, goat, and various kinds of deer. Among serpents are the python and the cobra. Pheasants, partridges, snipe, wild peacock, and many kinds of water-fowl abound. Coal, oil and lime are exported to Bengal. There is no single Assamese nationality, and the Assamese language is merely a modern dialect of Bengali. Population 6,126,343, of which about 3,000,000 are Hindus, 1,500,000 Mohammedans, 9000 Buddhists and 17,000 Christians.

Assassination (a-sas'i-nā'shun), a term denoting the killing of any one by surprise or treachery. It is usually applied to the murder of a public personage by one who aims solely at the death of his victim. Among the most important assassinations are:

- Philip of Macedon, 336 B. C.
- Julius Caesar, 44 B. C.
- Albert, Emperor of Germany, 1308.
- James I of Scotland, 1437.
- William of Orange, 1584.
- Henry III of France, 1589.
- Henry IV of France, 1610.
- Gustavus III of Sweden, 1792.
- Marat, 1793.
- Paul, Czar of Russia, 1801.
- Lincoln, President of U. S., 1865.
- Alexander II, Czar of Russia, 1881.
- Garfield, President of U. S., 1881.
- Carnot, President of France, 1894.
- King Humbert of Italy, 1900.
- McKinley, President of U. S., 1901.
- Alexander, King of Serbia, and his wife, Queen Draga, 1903.
- Sergius, Grand Duke of Russia, 1905.
- Carlos, King of Portugal, 1908.
- Louis Philippe, Crown Prince of Portugal, 1908.
- Prince Ito of Japan, 1900.
- Madero, President of Mexico, 1913.
- George, King of Greece, 1913.
- Archduke Francis Ferdinand of Austria-Hungary and his wife, Duchess of Hohenberg, June 28, 1914.
- Jaurès, French socialist leader, July 31, 1914.
- Count Tisza, Hungarian statesman, November 1, 1918.
- Paes, President of Portugal, December 14, 1918.
- Dr. Karl Liebknecht, German radical socialist, January 17, 1919.

Assassins (a-sas'inz), an Asiatic order or society having the practice of assassination as its most distinctive feature, founded by Hassan

Ben Habbah, a *dai* or missionary of the heterodox Mohammedan sect, the Ismaelites. The society grew rapidly in numbers, and in 1090 the Persian fortress of Alamut fell into their hands. Other territories were added, and the order became a recognized military power. Its organization comprised seven ranks, at its head being the Sheikh-al-Jebal or 'Old man of the mountains.' Upon a select band fell the work of assassination, to which they were stimulated by the intoxicating influence of *hashish*. From the epithet *Hashishim* (hemp-eaters) which was applied to the order, the European word *assassin* has been derived. For nearly two centuries they maintained their power under nine sheiks. Hassan, after a long and prosperous reign, died in 1124. Most of his successors died violent deaths at the hands of relatives or dependents. After proving themselves strong enough to withstand the powerful sultans Nouredin and Saladin, and making themselves feared by the Crusaders, the *Assassins* were overcome by the Tartar leader, Hulaku. The last chief, Rokneddin, was killed for an act of treachery subsequent to his capture, and his death was followed by a general massacre of the Assassins, in which 12,000 perished. Dispersed bands led a roving life in the Syrian mountains, and it is alleged that in the Druses and other small existing tribes their descendants are still to be found.

Assault (as-salt'), in law, an attempt or offer, with force and violence, to do a corporal hurt to another, as by striking at him with or without a weapon. If a person lift up or stretch forth his arm and offer to strike another, or menace any one with any staff or weapon, it is an assault in law. Assault, therefore, does not necessarily imply a hitting or blow, because in trespass for assault and battery a man may be found guilty of the assault and acquitted of the battery. But every battery includes an assault.

Assaye, ASSYE (as-si'), a village in Southern India, in Hyderabad, where Wellington (then Major-general Wellesley) gained a famous victory in 1803. With only 4500 troops at his disposal he completely routed the Mahratta force of 50,000 men and 100 guns. The victory, however, cost him more than a third of his men.

Assaying (a-sā'ing), the estimation of the amount of pure metal, and especially of the precious metals, in an ore or alloy. In the case of silver the assay is either by the dry or by the wet process. The dry process is

called *cupellation* from the use of a small and very porous cup, called a *cupel*, formed of well-burned and finely-ground bone-ash made into a paste with water. The cupel, being thoroughly dried, is placed in a fire-clay oven about the size of a drain-tile, with a flat sole and arched roof, and with slits at the sides to admit air. This oven, called a *muffle*, is set in a furnace, and when it is at a red heat the assay, consisting of a small weighed portion of the alloy wrapped in sheet-lead, is laid upon the cupel. The heat causes the lead to volatilize or combine with the other metals, and to sink with them into the cupel, leaving a bright globule of pure metallic silver, which gives the amount of silver in the alloy operated on. In the wet process the alloy is dissolved in nitric acid, and to the solution are added measured quantities of a solution of common salt of known strength, which precipitates chloride of silver. The operation is concluded when no further precipitate is obtained on the addition of the salt solution, and the quantity of silver is calculated from the amount of salt solution used. An alloy of gold is first cupelled with lead as above, with the addition of three parts of silver for every one of gold. After the cupellation is finished the alloy of gold and silver is beaten and rolled out into a thin plate, which is curled up by the fingers into a little spiral or *cornet*. This is put into a flask with nitric acid, which dissolves away the silver and leaves the cornet dark and brittle. After washing with water the cornet is boiled with stronger nitric acid to remove the last traces of silver, well washed, and then allowed to drop into a small crucible, in which it is heated, and then it is weighed. The assay of gold, therefore, consists of two parts: *cupellation*, by which inferior metals (except silver) are removed; and *quartation*, by which the added silver and any silver originally present are got rid of. The quantity of silver added has to be regulated to about three times that of the gold. If it be more the cornet breaks up, if it be less the gold protects small quantities of the silver from the action of the acid. Where, as in some gold manufactured articles, these methods of assay cannot be applied, a streak is drawn with the article upon a *touchstone* consisting of coarse-grained Lydian quartz saturated with bituminous matter, or of black basalt. The practised assayer will detect approximately the richness of the gold from the color of the streak, which may be further subjected to an acid test.

Assegai (as'se-gä), a spear used as a weapon among the Kaffirs of S. Africa, made of hard wood tipped with iron, and used for throwing or thrusting.

Assembly (as-sem'bll), **GENERAL**, the supreme ecclesiastical court of the Established Church of Scotland, consisting of delegates from every presbytery, university, and royal burgh in Scotland. The Free Church of Scotland also has a General Assembly and also the Presbyterian churches in Ireland and America.

Assembly, **NATIONAL** (France), a body set up in France on the eve of the revolution. Upon the convocation of the States-general by Louis XVI the privileged nobles and clergy refused to deliberate in the same chamber with the commons or *tiers-état* (third estate). The latter, therefore, on the proposition of the Abbé Siéyès, constituted themselves an *assemblée nationale*, with legislative powers (June 17, 1789). They bound themselves by oath not to separate until they had furnished France with a constitution, and the court was compelled to give its assent. In the 3250 decrees passed by the assembly were laid the foundations of a new epoch, and having accomplished this task it dissolved itself, Sept. 30, 1791.

Assen, capital of the province of Drenthe, in the Netherlands, 15 miles s. of Groningen. Pop. 11,191.

As'ser, JOHN, a learned British ecclesiastic, originally a monk of St. David's, distinguished as the instructor, companion, and biographer of Alfred the Great, who appointed him abbot of two or three different monasteries, and finally Bishop of Sherborne, where he died in 908 or 910. His life of Alfred, written in Latin (*Annals Rerum Gestarum Ælfredi Magni*), is of very great value, though its authenticity has been questioned. There is an English translation in Bohn's Antiquarian Library.

Assessment (a-ses'ment), the act of determining the value of a man's property or occupation for the purpose of levying a tax.—The sum assessed or levied; a tax; a rate.—An *assessment of damages* is the fixing of the amount of damages to which the prevailing party in a suit is entitled.

Assessor (a-ses'or), a person appointed to ascertain and fix the amount of taxes, rates, etc., and to make assessments. The 'assessors of taxes,' so named in the United States, are commonly termed 'surveyors' in England.

Assets (as'ets; French, *esses*, enough), property or goods available for the payment of a bankrupt or deceased person's obligations. Assets are personal or real, the former comprising all goods, chattels, etc., devolving upon the executor as salable to discharge debts and legacies. In commerce and bankruptcy the term is often used as the antithesis of 'liabilities,' to designate the stock in trade and entire property of an individual or an association.

Assideans, or CHASIDIM, a party that sprang up among the Jews during the Maccabean struggles. Its purpose was to maintain the Jewish law and resist the growing influence of Hellenism. A similar movement has spread among the Jews of Eastern Europe and the Orient, which has for its object a closer communion with God through the Kabbalah, and the exaltation of the office of rabbi.

Assiento (as-i-en'tō), the permission of the Spanish government to a foreign nation to import negro slaves from Africa into the Spanish colonies in America, for a limited time, on payment of certain duties. It was accorded to the Netherlands about 1552, to the Genoese in 1580, and to the French Guinea Company (afterwards the *Assiento* Company) in 1702. In 1713 the celebrated *assiento* treaty with Britain for thirty years was concluded at Utrecht. By this contract the British obtained the right to send yearly a ship of 500 tons, with all sorts of merchandise, to the Spanish colonies. This led to frequent abuses and contraband trade; acts of violence followed, and in 1739 a war broke out between the two powers. At the peace of Aix-la-Chapelle, in 1748, four years more were granted to the British; but in the Treaty of Madrid, two years later, £100,000 sterling were promised for the relinquishment of the treaty, remaining years, and the contract was annulled.

Assignats (as-ē-nyā), the name of the national paper currency in the time of the French revolution. Assignats to the value of four hundred million francs were first struck off by the Constituent Assembly, with the approbation of the king, April 19, 1790, to be redeemed with the proceeds of the sale of the confiscated goods of the church. August 27th of the same year, Mirabeau urged the issuing of 2,000,000,000 francs of new assignats, which caused a dispute in the assembly. Vergasse and Dupont, who saw that the plan was an invention of Clavière for his own enrichment, particularly distinguished themselves as the opponents of the scheme.

Mirabeau's exertions, however, were seconded by Pétion, and 800,000,000 francs more were issued. They were increased by degrees to 45,578,000,000, and their value rapidly declined. In the winter of 1792-93 they lost 30 per cent., and in spite of the law to compel their acceptance at their nominal value they continued to fall till in the spring of 1793 they had sunk to one three hundred and forty-fourth their nominal value. This depreciation was due partly to the want of confidence in the stability of the government, partly to the fact that the coarsely-executed and easily counterfeited assignats were forged in great numbers. They were withdrawn by the Directory from the currency, and at length redeemed by mandates at one-thirtieth of their nominal value.

Assignee (as-j-nē'), a person appointed by another to transact some business, or exercise some particular privilege or power. Formerly the persons appointed under a commission of bankruptcy, to manage the estate of the bankrupt on behalf of the creditors, were so called, but now *trustees* or *receivers*.

Assignment (a-sin'ment), is a transfer by deed of any property, or right, title, or interest in property, real or personal. Every demand connected with a right of property is assignable.

Assimilation (a-sim-i-lā'shun), the process by which food substances are converted into animal tissue. The nutritive elements are first taken into the blood, and conveyed to all parts of the body, there to aid in rebuilding tissues that have become wasted through organic activity. The tissues draw from the blood suitable material and in some way not known to us add it to their structure. It is this final act that constitutes assimilation. By it bones are united after being broken, and even lost portions of them restored, and whole limbs of some of the lower animals are often rebuilt when lost. In some cases a great part of the body can be thus restored.

Assiniboia (a-sin-i-bol'a), the smallest of the four districts into which a portion of the northwestern territories of Canada was divided in 1882. It is now divided unequally between the two new provinces formed in 1905 out of those four territories, the greater part of it being assigned to Saskatchewan, and a western strip to Alberta. It contains much good wheat land. Some coal is mined. Timber is plentiful and varied.

Assiniboine (a-sin'i-boin), a river of Canada, which flows through Manitoba and joins the Red River at Winnipeg, about 40 miles above the entrance of the latter into Lake Winnipeg, after a somewhat circuitous course of about 500 miles from the west and northwest. Steamers ply on it for over 300 miles.

Assisi (as-si'si), a small town in Italy, in the province of Perugia, 20 miles north of Spoleto, the see of a bishop, and famous as the birthplace of St. Francis d'Assisi. The splendid church built over the chapel where the saint received his first impulse to devotion is one of the finest remains of mediæval Gothic architecture.

Assizes (a-si'zez), a term chiefly used in England to signify the sessions of the courts held at Westminster prior to Magna Charta, but thereafter appointed by successive enactments to be held annually in every county. Twelve judges, who are members of the highest courts in England, twice in every year perform a circuit into all the counties into which the kingdom is divided (the counties being grouped into seven circuits), to hold these assizes, at which both civil and criminal cases are decided. Occasionally this circuit is performed a third time for the purpose of jail-delivery. In London and Middlesex, instead of circuits, courts of *nisi prius* are held. At the assizes all the justices of the peace of the county are bound to attend. Special commissions of assize are granted for inquest into certain crimes.

Among the more important historic uses of the term *assize* are its application to any sitting or deliberative council, and its transference thence to their ordinances, decrees, or assessments. In the latter sense we have the Assizes of Jerusalem, a code of feudal laws formulated in 1099 under Godfrey of Bouillon; the Assizes of Clarendon (1166), of Northampton (1176), and of Woodstock (1184); also the *assise venalium* (1203), for regulating the prices of articles of common consumption; the Assize of Arms (1181), an ordinance for organizing the national militia, etc.

Associated Press (a-sô'si-â-t-ed), a combination of daily newspapers, formed in New York in 1850, for the procuring of news by telegraph, or otherwise. For a time it was strongly opposed by a rival organization, but has latterly renewed its strength, and remains the leading distributor of news in the country.

Association (a-sô'shi-â-shun) or

IDEAS, the term used in psychology to comprise the concepts under which one idea is able to pass to another to consciousness. Recently some psychologists have been disposed to classify these conditions under two general heads: the law of contiguity and the law of association. The first states the fact that actions, sensations, emotions, and ideas, which have occurred together, or in close succession, tend to suggest each other when any one of them is afterwards presented to the mind. The second indicates that present actions, sensations, emotions, or ideas tend to recall their like from among previous experiences. Other laws have at times been enunciated, but they are reducible to these; thus, the 'law of contrast or contrariety' is properly a case of contiguity. On their physical side the principles of association correspond with the physiological facts of re-excitation of the same nervous centers, and in this respect they have played an important part in the endeavor to place psychology upon a basis of positive science. The laws of association, taken in connection with the law of relativity, are held by many to be a complete exposition of the phenomena of intellect.

Assonance (as'-o-nans), in poetry, a term used when the terminating words of lines have the same vowel-sound but make no proper rhyme. Such verses, having what we should consider false rhymes, are regularly employed in Spanish poetry; but cases are not wanting in leading British poets. Mrs. Browning not only used them frequently, but justified the use of them.

Assouan (as-sô-an'), or ESSOUAN (*Syênê*), a town of Upper Egypt, on the east bank of the Nile, below the first cataract. The granite quarries of the Pharaohs, from which were procured the stones for the great obelisks and colossal statues of ancient times, are in the neighborhood. Here the British authorities began the building of a colossal dam across the Nile in 1880 and finished it in 1902. It forms a great lake, enabling a large area of land to be irrigated, but burying under its waters in great part the magnificent temple of Isis on the island of Philæ. A height of 23 feet more is being added to the dam, which will completely submerge the temple. The whole dam will supply water to 950,000 acres of land. Trade in dates, senna, etc. Pop. (1907) 16,128.

Assumpsit (a-sum'sit), in common law, an action to recover

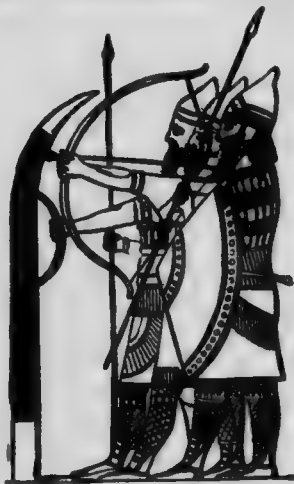
compensation for the non-performance of a *parole* promise; that is, a promise not contained in a deed under seal. Assump-sits are of two kinds, *express* and *implied*. The former are where the contracts are actually made in word or writing; the latter are such as the law implies from the justice of the case; e. g., employment to do work implies a promise to pay.

Assumption (a-sum'shun), the ecclesiastical festival celebrating the miraculous ascent into heaven of the Virgin Mary's body as well as her soul, kept on the 15th of August. The legend first appeared in the third or fourth century, and the festival was instituted some three centuries later.

Assumption, a city in Paraguay. See *Asuncion*.

Assurance. See *Insurance*.

Assyria (a-sir'i-a; the *Asshur* of the Hebrews, *Athura* of the ancient Persians), an ancient monarchy in Asia, intersected by the upper course of the Tigris, and having the Armenian mountains on the north and Babylonia on the south; area, probably about 100,000 sq. miles; surface partly mountainous, hilly, or undulating, partly a portion of the fertile Mesopotamian plain. The



Assyrian Soldiers.

numerous remains of ancient habitations show how thickly this region must have once been peopled; now, for the most part, it is a mere wilderness. The chief cities of Assyria in the days of its prosperity were Nineveh, the site of which is marked by mounds opposite Mosul (Nebi Yunus and Koyunlik), Calah or Kalakh (the modern Nimrud), Asshur or Al Asur (Kalah Sherghat), Dur-Sargon (Khorsabad), and Arbela (Arbil).

Much light has been thrown on the history of Assyria by the decipherment of the cuneiform inscriptions obtained by excavation. The assertion of the Bible that the early inhabitants of Assyria went from Babylonia is in conformity with the traditions of later times, and with inscriptions on the disinterred Assyrian monuments. For a long period the country was subject to governors appointed by the kings of Babylonia, but it became independent probably as early as 1500 B. C. About the end of the fourteenth century its king, Shalmaneser, is said to have founded the city of Kalakh or Calah; his son Tiglath-Ninip conquered the whole of the valley of the Euphrates. The five following reigns were chiefly occupied by wars with the Babylonians, who had thrown off the Assyrian yoke. About 1120 Tiglath-Pileser I, one of the greatest of the sovereigns of the first Assyrian monarchy, ascended the throne, and carried his conquests to the Mediterranean on the one side and to the Caspian and the Persian Gulf on the other. At his death there ensued a period of decline, which lasted over 200 years. Under Assur-nazir-pal, who reigned from 884 to 859 B. C., Assyria once more advanced to the position of the leading power in the world, the extent of his kingdom being greater than that of Tiglath-Pileser. The magnificent palaces, temples, and other buildings of his reign prove the advance of the nation in wealth, art, and luxury. In 859 he was succeeded by his son Shalmaneser II, whose career of conquest was equally successful. He reduced Babylon to a state of vassalage, and came into hostile contact with the kings of Palestine, Tyre and Sidon. The old dynasty came to an end in the person of Assurnirari II, who was driven from the throne by a usurper, Tiglath-Pileser, in 745, after a struggle of some years. No sooner was this able ruler firmly seated on the throne than he made an expedition into Babylonia, followed by conquering inroads into Syria and Armenia. He carried the Assyrian arms from Lake Van on the north to the Persian Gulf on the south, and from the confines of India on the east to the Nile on the west. He was, however, driven from his throne by Shalmaneser IV (727), who blockaded Tyre for five years, invaded Israel, and besieged Samaria, but died before the city was reduced. His successor, Sargon (722-705), a usurper, claimed descent from the ancient Assyrian kings, and proved an able ruler and soldier. He subdued Damascus, Elam and Babylon, advanced through Philistia and defeated

the forces of Egypt and Gaza. In 710 Merodach-Baladan was driven out of Babylonia by Sargon, after holding it for twelve years as an independent king, and being supported by the rulers of Egypt and Palestine; his allies were also crushed, Judah was overrun, Ashdod leveled to the ground, and Cyprus taken. He spent the latter years of his reign in internal reforms, in the midst of which he was murdered, being succeeded by Sennacherib, one of his younger sons, in 705. Sennacherib at once had to take up arms against Merodach-Baladan, who had again obtained possession of Babylon. In 701 fresh outbreaks in Syria led him in that direction, and King Hezekiah of Judea was defeated and forced to pay tribute. A second expedition into Syria is briefly recorded in II Kings, xix, where we are told that, as his army lay before Libnah, in one night the angel of Jehovah went out, and smote in the camp of the Assyrians 185,000 men. In 681 he was murdered by his two sons, Adrammelech and Sharezer, but they were defeated by their brother Esar-haddon, who then mounted the throne. Esar-haddon fixed his residence at Babylon, and made it his capital. The most important event of this reign was the conquest of Egypt, which was reduced to a state of vassalage. He associated his son Assur-bani-pal with him in the government of the kingdom (669), and two years later this prince (the Sardanapalus of the Greeks) became sole ruler. In 652 a general insurrection broke out, headed by Sam-mughes, governor of Babylonia, Assur-bani-pal's own brother, and including Babylonia, Egypt, Palestine, and Arabia. Egypt was the only power, however, which regained its independence; fire, sword, and famine reduced the rest to submission. In 640 the Medes revolted, and later made themselves independent. Though the king's character was marked by cruelty and sensuality, he was a zealous patron of the arts and learning. He died in 625, and was succeeded by his son Assur-emid-ilin (or Sarakos), under whom Babylon definitely threw off the Assyrian yoke. The country continued rapidly to decline, fighting hard for existence until the capital Nineveh was captured and burned by the allied forces of the Medes and Babylonians, about 607 or 606 B.C., and the great Assyrian empire came to an end. The story of Sardanapalus associated with this event is a mere myth or legend. Assyria now fell partly to Media, partly to Babylonia, and afterwards formed with Babylonia one of the satrapies of the Persian empire. In 321 B.C. it became

part of the kingdom of the Seleucids; later on it came under Parthian rule, and was more than once a Roman possession. For a long period it was under the caliphs of Bagdad. In 1638 the Turks wrested it from the Persians, and it has continued under their dominion since that date.

The original inhabitants of Assyria and Babylonia are known as Accadians (or Sumerians). They seem to have belonged to the Turanian or Ural-Altaic race, to the same stock as that from which the Finns, Turks, and Magyars have descended. In early times a Semitic people spread over the country, and mingled with or supplanted the original inhabitants, while their language took the place of the Accadian, the latter becoming a dead language. The Assyrian language is closely allied to Hebrew and Phœnician, and changed little throughout the 1500 years during which we can trace it in the inscriptions. It continued to be written with the cuneiform or arrowheaded character down to the third century B.C. The greater part of the Assyrian literature was stamped in minute characters on baked bricks, the subjects comprising hymns to the gods, mythological and epic poems, and works on history, chronology, astrology, law, etc. The Accadian literature was largely reproduced, the dead language in which it was written becoming classical and studied as Greek and Latin are in our day. The Assyrian religion was almost the same as that of Babylonia, but in addition to the worship of the Babylonian deities Assyrians adored their national deity, Assur, who was called king of all the gods, the god who created himself. He was symbolically represented by a winged circle inclosing the figure of an archer. After Assur came twelve chief deities; among these twelve ruling gods were Anu, the father of the gods; Bel, the lord of the world; Sin, the moon-god; Shamas, the sun-god; Istar, a powerful goddess with various attributes; Ninip, god of hunting (the man-bull); Nergal, god of war (the man-lion); etc. A number of spirits, good and evil, presided over the minor operations of nature. There were set forms regulating the worship of all the gods and spirits, and prayers to each were inscribed on clay tablets with blanks for the names of the persons using them.

The Assyrians were far advanced in art and industry, and in civilization in general. They constructed large buildings, especially palaces, of a most imposing character, the materials being brick, burned or sun-dried, stone, alabas-

ter slabs for lining and adorning the walls internally and externally, and timber for pulleys and roofs. These alabaster slabs were elaborately sculptured with designs serving to throw much light on the manners and customs of the people. A most



Portal at Khorsabad.

characteristic feature of the palaces were gigantic figures of winged, human-headed bulls, placed at gateways (often arched over) or other important points; figures of lions, etc., were also similarly employed. The palaces were raised on high terraces, and often comprised a great number of apartments; there were no windows, light being obtained by carrying the walls up to a certain height and then raising on them pillars to support the roof and admit light and air. The Assyrian sculptures, as a rule, were in relief, figures in the full round being the exception. In many cases, however, as in those of winged bulls and other monsters, a compromise was attempted between the full round and relief, the heads being worked free and the body in relief, with an additional leg to meet the exigencies of different points of view. More than three-quarters of the reliefs are of warlike scenes; hunting scenes are also favorite subjects; occasionally industrial scenes in connection with palace building are represented, and less frequently religious ceremonies. The artists had no conception of perspective. In some of the hunting scenes an exceedingly high level of art is attained. The vestiges of Assyrian painting consist chiefly of fragments of stucco and glazed tiles, on which are bands of ornament, rows of rosettes and anthemions, woven strap-work, conventionalized mythic animals, and occasionally figures. In these traces of Egyptian influence are to be found, but the Assyrian figure type is, for the most part, of a more voluptuous and vigorous fullness than the Egyptian. Of the advanced condition of the Assyrians in various other respects we have ample evidence. They understood and applied the arch; constructed tunnels, aqueducts,

and drains; used the pulley, the lever, and the roller; engraved gems in a highly artistic way; understood the arts of inlaying, enameling, and overlaying with metals; manufactured porcelain, transparent and colored glass, and were acquainted with the lens; and possessed vases, jars, and other dishes, bronze and ivory ornaments, bells, gold ear-rings and bracelets of excellent design and workmanship. Their household furniture also gives a high idea of their skill and taste. The cities of Nineveh, Assur, and Arbela had each their royal observatories, superintended by astronomers-royal, who had to send in their reports to the king twice a month. At an early date the stars were numbered and named; a calendar was formed, in which the year was divided into twelve months (of thirty days each), called after the zodiacal signs, but as this division was found to be inaccurate an intercalary month was added every six years. The week was divided into seven days, the seventh being a day of rest; the day was divided into twelve periods of two hours each, each of these being subdivided into sixty minutes, and these again into sixty seconds. The Assyrians employed both the dial and the clepsydra. Eclipses were recorded from a very remote epoch, and their recurrence roughly determined. The principal astronomical work, called the Illumination of Bel, was inscribed on seventy tablets, and went through numerous editions, one of the latest being in the British Museum. It treats among other things of comets, the polar star, the conjunction of the sun and moon, and the motions of Venus and Mars. Much of this activity in the arts and sciences was a continuation of that of the Accadians of Babylonia, who had advanced far in astronomical and other studies long before the rise of the Assyrian empire.

Assyriology, the department of knowledge which deals with Assyrian antiquities and history, is entirely a modern study. Until 1842 the materials for Assyrian history were derived from the Jewish records of the Old Testament and from such comparatively late writers as Herodotus and Ctesias. In 1843-46 M. Botta, the French consul at Mosul, made the first explorations at Koyunjik and Khorsabad, and the objects thus obtained were transported to the Louvre. In 1845 and in 1849 valuable researches were conducted by Mr. Layard, and subsequently continued by the British Museum trustees. Later researches were instituted by the proprietors of the *Daily Telegraph*, and then by the British government, in which Mr. George Smith

met with considerable success. Subsequently Mr. Rassam carried on the work of discovery. In the decipherment and translation of the cuneiform inscriptions among the most distinguished names are those of Sir Henry Rawlinson, Mr. H. Fox Talbot, Mr. George Smith, M. Jules Oppert, Dr. Schrader, Dr. Hincks, Rev. A. H. Sayce, Mr. Le Page Renouf, Prof. Terrien de la Couperie, Mr. Boscawen, Mr. Pinches, Prof. Hilprecht, and Dr. Peters.

Ast, GEORG ANTON FRIEDRICH, German scholar and philosopher, born 1778; died 1841. He wrote on æsthetics and the history of philosophy, but is best known as an editor of Plato, whose works he published with a Latin translation and commentary.

Astacus (as'ta-kus). See *Crawfish*.

Astarte (as-tar'te), a Syrian goddess, probably corresponding to the *Semêlê* of the Greeks and the *Ashtaroth* of the Hebrews, and representing the productive power of nature. She was a moon-goddess. Some regard her as corresponding with *Hera* (*Juno*), and others with *Aphrodite*. See *Ashtaroth*.

Astatic (as-tat'ik) NEEDLE, a magnetic needle having another needle of the same intensity fixed parallel to it, the poles being reversed, so that the needles neutralize one another, and are unaffected by the earth's magnetism: used in the *astatic galvanometer*.

Aster (as'ter), a genus of plants, natural order *Compositæ*, comprehending several hundred species, mostly natives of North America, although others are widely distributed. Many are cultivated as ornamental plants. Asters generally flower late in the season, and some are hence called Michaelmas or Christmas Daisies. The China Aster (*Aster* or *Callistêphus Chinensis*) is a very showy annual, of which there are many varieties.

Asterbad. See *Astrabad*.

Asteria (as-te'ri-a), a name applied to a variety of corundum, which displays an opalescent star of six rays of light when cut with certain precautions; and also to the *cat's-eye*, which consists of quartz, and is found especially in Ceylon.

Asteridæ. See *Asteroidæ*.

Asterisk (as'ter-isk), the figure of a star, thus *, used in printing and writing, as a reference to a passage or note in the margin, or to fill the space when a name, or the like, is omitted.

Asteroidæ (as-ter-oid'æ-a), the order of the Echinodermata to which the star-fishes belong. See *Star-fishes*.

Asteroids (as'ter-oids), or PLANET-oids, a numerous group of very small planets revolving round the sun between the orbits of Mars and Jupiter, remarkable for the eccentricity of their orbits and the large size of their angle of inclination to the ecliptic. The diameter of the largest is not supposed to exceed 450 miles, while most of the others are very much smaller. They number over 700, large numbers having recently been discovered by the aid of photography, though these are fast decreasing. Ceres, the first of them, was discovered 1st January, 1801, and within three years more Pallas, Juno, and Vesta were seen. The extraordinary smallness of these bodies, and their nearness to each other, gave rise to the opinion that they were but the fragments of a planet that had formerly existed and had been brought to an end by some catastrophe. For nearly forty years investigations were carried on, but no more planets were discovered till 8th December, 1845, when a fifth planet in the same region was discovered. The rapid succession of discoveries that followed was for a time taken as a corroboration of the disruptive theory, but the breadth of the zone occupied makes the hypothesis of a shattered planet more than doubtful. Their mean distances from the sun vary between 194,000,000 and 400,000,000 miles; the periods of revolution between 3 years, 3 days and 8 years, 11 months. Their eccentricities and inclinations are on the average greater than those of the earth; their total mass cannot be measured with any approach to accuracy. One of the most interesting of them, discovered in 1898 and named Eros, owes its interest to the fact that its nearest approach to the sun comes within the orbit of Mars, thus bringing it nearer the earth than any planetary body except the moon. Other late discoveries carry the asteroidal orbits beyond Jupiter, so that these bodies occupy an area of immense width.

Asterolepis (as-te-rol'e-pis), a genus of gigantic ganoid fishes, now found only in a fossil state in the Old Red Sandstone. From the remains it would seem that these fishes must have sometimes attained the length of 18 or 20 feet.

Asthma (ast'ma), difficulty of respiration returning at intervals, with a sense of stricture across the chest and in the lungs, a wheezing.

hard cough at first, but more free towards the close of each paroxysm, with a discharge of mucus, followed by a remission. Asthma is essentially a spasm of the muscular tissue which is contained in the smaller bronchial tubes. It generally attacks persons advanced in years, and seems, in some instances, to be hereditary. The exciting causes are various—accumulation of blood or viscid mucus in the lungs, noxious vapors, a cold and foggy atmosphere, or a close, hot air, flatulence, accumulated feces, violent passions, organic diseases in the thoracic viscera, etc. It frequently accompanies hay fever. By far the most important part of the treatment consists in the obviating or removing the several exciting causes. It seldom proves fatal except as inducing dropsy, consumption, etc.

Asti (as'tē), a town of Northern Italy, province of Alessandria, 28 miles E. S. E. of Turin, the see of a bishop, with an old cathedral. In the middle ages it was one of the most powerful republics of Northern Italy. It was the birthplace of Alfieri, the poet, whose statue adorns the principal square. A favorite wine is produced in the neighborhood. Pop. 18,372.

Astigmatism (as-tig'ma-tizm), a defect of vision (capable of correction by suitable glasses), in consequence of which the individual does not see objects in the same plane, although they may really be so. It is due to the degree of convexity of the horizontal and vertical meridians being different, so that corresponding rays, instead of converging into one point, meet at two foci.

Astle (as'tl), THOMAS, an English antiquary, born 1734; died 1803. He was a trustee of the British Museum and keeper of the public records in the Tower. His chief work, *The Origin and Progress of Writing*, appeared in 1784.

Astomata (as-tom'a-ta), one of the two groups into which the Protozoa are divided with regard to the presence or absence of a mouth, of which organ the Astomata are destitute. The group contains two classes, Gregarinida and Rhizopoda. See *Stomapoda*.

Aston Manor, a large English manufacturing town and parliamentary borough, just N. of Birmingham, with which its industries are connected. Pop. 75,042.

As'tor, JOHN JACOB, born near Heidelberg, Germany, 1763; died at New York, 1848. In 1783 he emigrated to the United States, settled at New York, and became extensively engaged in the fur trade. In 1811 the settlement of

Astoria, founded by him, near the mouth of the Columbia River, was formed to serve as a central depot for the fur trade between the lakes and the Pacific. He subsequently engaged in various speculations, and died worth \$20,000,000, leaving \$400,000 to found the Astor Library in New York. This institution is now associated with the New York public library, in common with the Lenox and Tilden Libraries.—WILLIAM WALDORF (Viscount), great-grandson of former, born in New York, 1848; died at Brighton, England, Oct. 18, 1919. He became an English subject in 1899, was created baron in 1916, viscount in 1917. In 1893 he founded the *Pall Mall Magazine*. Author of *Pharaoh's Daughter*, etc.

Astoria (as-tor'i-a), a city of Clatsop county, Oregon, at the mouth of the Columbia River, 70 miles N. W. of Portland. It is one of the largest canning centers and lumber-shipping points in the West. It was founded by John Jacob Astor in 1811. Pop. (1910) 9500.

Astor Place Riot, a riot in New York City on May 10, 1849, between partisans of Edwin Forrest, the American actor, and Macready, who was acting at the Astor Place Opera House. Suppressed by the militia. Twenty-one persons were killed, 36 wounded.

Astrabad (as-trá-bád'), a town of Persia, capital of a province of the same name on the Caspian. It was formerly the residence of the Kajar princes, the ancestors of the present Persian dynasty. It is very unhealthy, and has been called the *City of the Plague*. Pop. estimated at from 8000 to 30,000.

Astræa (as-tré'a), in Greek mythology, the daughter of Zeus and Themis, and goddess of justice. During the golden age she dwelt on earth, but on that age passing away she withdrew from the society of men and was placed among the stars, where she forms the constellation Virgo. The name was given to one of the asteroids, discovered in 1845.

Astragal (as'tra-gal), in architecture, a small semicircular moulding, with a fillet beneath it, which surrounds a column in the form of a ring, separating the shaft from the capital.

Astragalus, a genus of papilionaceous plants, herbaceous or shrubby, and often spiny. *A. gummifer* yields gum tragacanth.

Astrakan (as-trá-hán'), a Russian city, capital of government of the same name, on an elevated island in the Volga, about 30 miles above its mouth in the Caspian, communicating with the opposite banks of the river by numerous bridges. It is the seat of a Greek archbishop and has a large cathed-

dral, as well as places of worship for Mohammedans, Armenians, etc. The manufactures are large and increasing, and the fisheries (sturgeon, etc.) very important. It is the chief port of the Caspian, and has regular steam communication with the principal towns on its shores. Pop. 150,000, composed of various races.—The government has an area of 91,327 square miles. It consists almost entirely of two vast steppes, separated from each other by the Volga, and forming, for the most part, arid, sterile deserts. Pop. 994,775.

Astrakan, a name given to sheepskins with a curled woolly surface obtained from a variety of sheep found in Bokhara, Persia, and Syria; also a rough fabric with a pile in imitation of this.

Astral Spirits, spirits formerly believed to people the heavenly bodies or the aerial regions. In the middle ages they were variously conceived as fallen angels, souls of departed men, or spirits originating in fire, and belonging neither to heaven, earth, nor hell. By Theosophists regarded as beings inhabiting the 'astral plane.'

Astringent (as-trin'jënt), a medicine which contracts mucous membranes of the body, thereby checking or diminishing excessive discharges therefrom. The chief astringents are the mineral acids, alum, lime-water, chalk, salts of copper, zinc, iron, lead, silver; and among vegetables catechu, kino, oak-bark, and galls (containing tannic acid).

Astrocaryum (as-trō-kā'ri-um), a genus of tropical American palms, species of which yield oil and valuable fiber. Tucum oil and tucum thread are obtained from *A. vulgäre*.

Astrolabe (as-trō-lāb), an instrument formerly used for taking the altitude of the sun or stars, now superseded by the quadrant and sextant. The name was also formerly given to an armillary sphere.

Astrology (as-trol'o-ji), literally, the science or doctrine of the stars. The name was formerly used as equivalent to astronomy, but is now restricted in meaning to the pseudoscience which pretends to enable men to judge of the effects and influences of the heavenly bodies on human and other mundane affairs, and to foretell future events by their situations and conjunctions. As usually practised the whole heavens, visible and invisible, were divided by great circles into twelve equal parts,

called *houses*. As the circles were supposed to remain immovable every heavenly body passed through each of the twelve houses every twenty-four hours. The portion of the zodiac contained in each house was the part to which chief attention was paid, and the position of any planet was settled by its distance from the boundary circle of the house, measured on the ecliptic. The houses had different names and different powers, the first being called the house of life, the second the house of riches, the third of brethren, the sixth of marriage, the eighth of death, and so on. The part of the heavens about to rise was called the *ascendant*, the planet within the house of the ascendant being *lord of the ascendant*. The different aspects of the planets were of great importance. To *cast a person's nativity* (or *draw his horoscope*) was to find the position of the heavens at the instant of his birth, which being done, the astrologer, who professed to know the various powers and influences possessed by the sun, the moon, and the planets, would predict what the course and termination of that person's life would be. The temperament of the individual was ascribed to the planet under which he was born, as *saturnine* from *Saturn*, *jovial* from *Jupiter*, *mercurial* from *Mercury*, etc., words which are now used with little thought of their original meaning. The virtues of herbs, germs, and medicines were supposed to be due to their ruling planets.

Astronomy (as-tron'o-mi; from Gr. *astron*, a star, and *nemein*, to arrange, classify) is that science which investigates the motions, distances, magnitudes, and various phenomena of the heavenly bodies. That part of the science which gives a description of the motions, figures, periods of revolution, and other phenomena of the heavenly bodies is called *descriptive astronomy*; that part which teaches how to observe the motions, figures, periodical revolutions, distances, etc., of the heavenly bodies, and how to use the necessary instruments, is called *practical astronomy*; and that part which explains the causes of their motions and demonstrates the laws by which those causes operate is termed *physical astronomy*. Recent years have added two new fields of investigation which are full of promise for the advancement of astronomical science. The first of these—*celestial photography*—has furnished us with invaluable light-pictures of the sun, moon, and other bodies, and has recorded the existence of myriads of stars, invisible even by the best telescopes; while the second *spectro-*

trum analysis, reveals to us a knowledge of the physical constituents of the universe, informing us, for instance, that in the sun (or its atmosphere) there exist many of the elements familiar to us on the earth. It has also been applied to the determination of the velocity with which stars are approaching to, or receding from, our system; and to the measurement of movements taking place within the solar atmospheric envelopes. From analysis of some of the unresolved nebulae the inference is drawn that they are not star-swarms but simply cosmical vapor; whence a second inference results favorable to the hypothesis of the gradual condensation of nebulae, and the successive evolutions of suns and systems.

The most remote period to which we can go back in tracing the history of astronomy refers us to a time about 2500 B.C., when the Chinese are said to have recorded the simultaneous conjunction of Saturn, Jupiter, Mars, and Mercury with the moon. This remarkable phenomenon is found, by calculating backward, to have taken place 2460 B.C. Astronomy has also an undoubtedly high antiquity in India. In the time of Alexander the Great, the Babylonians had records of astronomical observations reaching back 1800 years, and had probably been students of astronomy much earlier. They regarded comets as bodies traveling in extended orbits, and predicted their return, were familiar with the length of the year, and divided it up into months and weeks, and the day into hours and minutes as now existing. The priests of Egypt gave astronomy a religious character; but their knowledge of the science is testified to only by their ancient zodiacs and the position of their pyramids with relation to the cardinal points. Among the Greeks astronomy took a markedly scientific form. Thales of Miletus (born 639 B.C.) predicted a solar eclipse, and his successors held opinions which are in many respects in accordance with modern ideas. Pythagoras (500 B.C.) is credited with promulgating the theory of the revolution of the planets about a central luminary. Great progress was made in astronomy under the Ptolemies, and we find Timochares and Aristyllus employed about 300 B.C. in making useful planetary observations. But Aristarchus of Samos (born 267 B.C.) is said, on the authority of Archimedes, to have far surpassed them, by developing a genuine heliocentric system, which, however, had scant recognition. A hundred years later Hipparchus determined more exactly the length of the solar year, the eccentricity of the ecliptic,

the precession of the equinoxes, and even undertook a catalogue of the stars. It was in the second century after Christ that Claudius Ptolemy, a famous mathematician of Pelusium in Egypt, propounded the system that bears his name, viz., that the earth was the center of the universe, and that the sun, moon, and planets revolved around it in the following order: nearest to the earth was the sphere of the moon; then followed the spheres of Mercury, Venus, the Sun, Mars, Jupiter, and Saturn; then came the sphere of the fixed stars. In the *Almagest* Ptolemy developed at length his particular theories of astronomy, which were accepted by the scientific world until they were replaced by those of Copernicus. Ptolemy's labors were of vast importance to the advancement of the science. The Arabs began to make scientific astronomical observations about the middle of the eighth century, and for 400 years they prosecuted the science with assiduity. Ibn-Yunis (1000 A.D.) compiled the Hakimite Tables of the planets and recorded with accuracy two solar eclipses. In the sixteenth century Nicholas Copernicus, born in 1473, introduced the system that bears his name, and which gives to the sun the central place in the solar system, with the planetary bodies, the earth included, revolving around it. This arrangement of the universe (see *Copernicus*) came at length to be generally received as a result of later research and on account of the simplicity it substituted for the complexities and contradictions of the theory of Ptolemy. The observations and calculations of Tycho Brahe, a Danish astronomer, born in 1546, continued over many years, were of the highest value, and claim for him the title of regenerator of practical astronomy. His assistant and pupil, Kepler, born in 1571, was enabled, principally by the aid he received from his master's labors, to arrive at those laws which have made his name famous: 1. That the planets move, not in circular, but in elliptical orbits, of which the sun occupies a focus. 2. That the radius vector, or imaginary straight line joining the sun and any planet, moves over equal spaces in equal times. 3. That the squares of the times of the revolutions of the planets are as the cubes of their mean distances from the sun. Galileo, who died in 1642, advanced the science by his observations and by the new revelations he made through his possession of the telescope, which established the truth of the Copernican theory. Newton, born in 1642, carried physical astronomy far forward. Accepting Kepler's laws as a

statement of the facts of planetary motion he deduced from them his theory of gravitation. The science was enriched towards the close of the eighteenth century by the discovery by Herschel of the planet Uranus and its satellites, the resolution of the Milky Way into myriads of stars, and the unraveling of the mystery of nebulae and of double and triple stars. The splendid analytical researches of Lalande, Lagrange, Delambre, and Laplace mark the same period. The nineteenth century opened with the discovery of the first four minor planets; and the existence of another planet (Neptune) more distant from the sun than Uranus, was, in 1846, simultaneously and independently predicted by Leverrier and Adams. Of late years the sun has attracted a number of observers, the spectroscope and photography having been specially fruitful in this field of investigation. From recent transit observations the distance of the sun has been corrected, and is now given as a little less than 93,000,000 miles. An interesting recent discovery is that of two satellites of Mars, and of new, minute satellites of Saturn and Jupiter. Much valuable work has of late been accomplished in ascertaining the parallax of fixed stars.

The objects with which astronomy has chiefly to deal are the earth, the sun, the moon, the planets, the fixed stars, comets, nebulae, and meteors. The stellar universe is composed of an unknown host of stars, many millions in number, the most noticeable of which have been formed into groups called *constellations*. The nebulae are cloud-like patches of light scattered all over the heavens. Some of them have been resolved into star-clusters, but many of them are apparently masses of incandescent gas. The fixed stars preserve, at least to unaided vision, an unalterable relation to each other, because of their vast distance from the earth. The distance of only a few of them has been discovered, the nearest, Alpha Centauri, being 25 trillions of miles from the earth. Their apparent movement from east to west is the result of the earth's revolution on its axis in twenty-four hours from west to east. The planets have not only an apparent, but also a real and proper motion, since, like our earth, they revolve around the sun in their several orbits and periods. The nearest of these bodies to the sun—unless the hypothetical *Vulcan* really exists—is *Mercury*. *Venus*, the second planet from the sun, is the brightest and most beautiful of all the planets. The *Earth* is the first planet accompanied by a satellite or moon.

Mars, the next planet, has two satellites, as already mentioned. Its surface has a variegated character, and the existence of land, water, snow, and ice has been assumed. The *Asteroids*, of which over 700 have been observed, form a broad zone of small bodies circulating in the space between Mars and Jupiter. *Jupiter*, the largest planet of the system, has eight satellites, four discovered by Galileo, a fifth in 1892, two in 1904, and the eighth in 1908. *Saturn*, with his ten moons, and his broad thin rings with edges turned towards the planet, is, perhaps, the most striking telescopic object in the heavens. *Uranus*—discovered by Herschel in 1781—is accompanied by four satellites. *Neptune*, the farthest removed from the sun, has one satellite, the motion of which is retrograde. Besides the planets, quite a number of comets are known to be members of the solar system. The physical constitution of these bodies is still one of the enigmas of astronomy. The observation of meteors has recently attracted much attention. They most frequently occur in the autumn, and have been supposed to be the debris of comets. See articles *Earth, Sun, Moon, Planet, Comet, Stars, Mercury, Venus, Mars, Jupiter, Saturn, Asteroids*, etc.

Astur. See *Goshawk*.

Asturia (as-tō'ri-a) or THE ASTURIAS, a Spanish principality, now forming the province of Oviedo, on the north coast of Spain; an Alpine region, with steep and jagged mountain ridges, valuable minerals, luxuriant grazing lands, and fertile, well-watered valleys. The hereditary prince of Spain has borne since 1388 the title of Prince of the Asturias.

Astyages (as-tī'a-jēz), last king of the Medes, 593-558 B.C., deposed by Cyrus, an event which transferred the supremacy from the Medes to the Persians.

Asuncion (á-sun-thē-on') or NUESTRA SENORA DE LA ASUNCION (English, *Assumption*), the chief city of Paraguay, on the river Paraguay, picturesquely situated and with good public buildings. It was founded in 1536 on the feast of the Assumption. Its trade is mostly in the Paraguay tea, hides, tobacco, oranges, etc. It was taken and plundered by the Brazilians in 1869, and some of the leading buildings still remain in a half-ruined condition. A railway runs for a short distance into the interior. Pop. 31,719.

Aswail (as-wāil), native name for the sloth-bear (*Melursus labiatus*)

of the mountains of India, an uncouth, unwieldy animal, with very long black hair, inoffensive when not attacked. Its usual diet consists of roots, bees' nests, grubs, snails, ants, etc. Its flesh is in much favor as an article of food. When captured young it is easily tamed.

Asylum (a-si'lum), a sanctuary or place of refuge, where criminals and debtors sheltered themselves from justice, and from which they could not be taken without sacrilege. Temples were anciently asylums, as were Christian churches in later times. (See *Sanctuary*.) The term is now usually applied to an institution for receiving, maintaining, and, so far as possible, ameliorating the condition, of persons laboring under certain bodily defects or mental maladies; sometimes also a refuge for the unfortunate.

Asymptote (as'im-tôt), in geometry, a line which is continually approaching a curve, but never meets it, however far either of them may be prolonged. This may be conceived as a tangent to a curve at an infinite distance.

Asyndeton (a-sin'de-ton), a figure of speech by which connecting words are omitted; as 'I came, saw, conquered.'

Atacama (â-tâ-kâ'mâ), a desert region on the west coast of S. America belonging to Chile, comprised partly in the prov. of Atacama, partly in the territory of Antofagasta. It mainly consists of a plateau extending from Copiapó northward to the river Loa, and lies between the Andes and the sea. It forms the chief mining district of Chile, there being here rich silver mines, while gold is also found, as well as argentiferous lead, copper, nickel, cobalt, and iron; with guano on the coast. In its elevated parts saline, borax, and nitrate deposits occur. The northern portion till recently belonged to Bolivia. The Chilean prov. of Atacama has an area of 28,350 sq. miles and a pop. of 71,446.

Atacamite (â-tâ-kâ'mî), a mineral consisting of a combination of the protoxide and chloride of copper, occurring abundantly in some parts of South America, as at Atacama, whence it has its name. It is worked as an ore in South America, and is exported to England.

Atahualpa (â-tâ-hwâ'pâ), the last of the Incas, succeeded his father in 1529 on the throne of Quito, while his brother Huascar obtained the Kingdom of Peru. They soon made war against each other, when the latter was defeated, and his kingdom fell into the

hands of Atahualpa. The Spaniards, taking advantage of these internal disturbances, with Pizarro at their head, invaded Peru, and advanced to Atahualpa's camp. Here, while Pizarro's priest was telling the Inca how the pope had given Peru to the Spaniards, fire was opened on the unsuspecting Peruvians, Atahualpa was captured, and, despite the payment of a vast ransom in gold, was executed (1533).

Atalanta (at-a-lan'ta), in the Greek mythology, a Boeotian heroine famed for running. She was to be obtained in marriage only by him who could outstrip her in a race, the consequence of failure being death. One of her suitors, Hippomenes, obtained from Aphrodite (Venus) three golden apples, which he threw behind him, one after another, as he ran. Atalanta stopped to pick them up, and was, not unwillingly, defeated. There was another Atalanta belonging to Arcadia, who cannot very well be distinguished, the same stories being told about both.

Ataman. See *Hetman*.

Atavism (at'a-vizm; L. *atavus*, an ancestor), in biology, the tendency to reproduce the ancestral type in animals or plants which have become considerably modified by breeding or cultivation; the reversion of a descendant to some peculiarity of a more or less remote ancestor.

Ataxy (a-tak'si), **ATAXIA**, in medicine, irregularity in the animal functions, or in the symptoms of a disease. See *Locomotor ataxy*.

Atbara (ât-bar'â), the most northerly tributary of the Nile. It rises in the Abyssinian highlands, receives several large tributaries, and enters the Nile 17° 50' N.

Atchafalaya (atch-af-a-li-a; 'Lost Water'), a river of the United States, an outlet of the Red River which strikes off before the junction of that river with the Mississippi, flows southward, and enters the Gulf of Mexico by Atchafalaya Bay. Its length is about 220 miles, nearly all navigable.

Atcheen'. See *Acheen*.

Atchison (atch'is-son), a city of Kansas, capital of Atchison Co., on the Missouri River, 21 miles above Leavenworth. It was founded in 1854; is an important commercial city, having a very large shipping trade in grain, flour, and livestock and an extensive lumber trade. It has large flour mills, and many other manufactures. Here are several collegiate institutions

and a State soldiers' orphans' home. Pop. 16,429.

Ate, among the Greeks, the goddess of hate, injustice, crime, and retribution, daughter of Zeus according to Homer, but of Eris (Strife) according to Hesiod.

Ateles (at'e-lēz), a genus of American monkeys. See *Spider-monkey*.

Atellanæ Fabulæ (a-tel-ā'nē fab'ū-lē; called also *Oscan plays*), a kind of light interlude, in ancient Rome, performed not by the regular actors, but by freeborn young Romans; it originated from *Atella*, a city of the Oscans.

Atesha (at-esh'ga; the place of fire), a sacred place of the Guebres or Persian fire-worshippers, on the peninsula of Apsheron, on the w. coast of the Caspian, visited by large numbers of pilgrims, who bow before the sacred flames which issue from the bituminous soil.

Ath (āt), a fortified town of Belgium, in the province of Hainaut, on the Dender; it carries on weaving, dyeing, and printing of cottons. Pop. (1904) 11,201.

Athabasca (ath-a-bas'ka), a river, lake, and former district of Canada. The ATHABASCA river rises on the eastern slopes of the Rocky Mountains in the district of Alberta, flows in a N. E. direction through the district of the same name, and falls into Lake Athabasca after a course of about 600 miles.—LAKE ATHABASCA, lat. 59° N., long. 110° W., is about 180 miles S. S. E. of the Great Slave Lake, with which it is connected by means of the Slave River, a continuation of the Peace. It is about 200 miles in length from east to west, and about 35 miles wide at the broadest part, but gradually narrows to a point at either extremity.—The district of ATHABASCA, formed in 1882, lay immediately E. of British Columbia and N. of Alberta; area about 251,000 sq. miles. It was in 1905 almost equally divided between the two new provinces of Alberta and Saskatchewan. Large quantities of free gold have been discovered on the Albert route, 700 miles from Prince Albert, and successfully worked.

Athaliah (ath-a-lī'a), daughter of Ahab, King of Israel, and wife of Jehoram, King of Judah. After the death of her son Ahaziah she opened her way to the throne by the murder of forty-two princes of the royal blood. She reigned six years; in the seventh the high-priest Jehoiada placed Joash, the young son of Ahaziah, who had been secretly preserved, on the throne of his father, and

Athaliah was slain. See II Kings, viii, ix, xi.

Athanasian (a-tha-nā'shan) CREED, a creed or exposition of Christian faith, supposed formerly to have been drawn up by St. Athanasius, though this opinion is now generally rejected, and the composition often ascribed to Hilary, Bishop of Arles (about 430). It is an explicit avowal of the doctrines of the Trinity (as opposed to Arianism, of which Athanasius was an active opponent) and of the incarnation, and contains what are known as the 'damnatory clauses,' in which it declares that damnation must be the lot of those who do not believe the true and catholic faith. It is retained in the Greek, Roman and English services, but not in the American Book of Common Prayer.

Athanasius, St., Bishop of Alexandria, a renowned father of the church, born in that city about A.D. 296; died 373. While yet a young man he attended the council at Nice (325), where he gained the highest esteem of the fathers by the talents which he displayed in the Arian controversy. He had a great share in the decrees passed here, and thereby drew on himself the hatred of the Arians. Shortly after this event he was appointed Bishop of Alexandria. The complaints and accusations of his enemies at length induced the Emperor Constantine to summon him in 335 before the council of Tyre, when he was suspended, and soon afterwards banished to Treves, in Gaul. The death of Constantine put an end to this banishment, and Constantine II permitted him to return. He was deposed again in 339, and was reinstated in 346. Again in 356 he was sentenced to be banished, when he retired into those desert parts of Upper Egypt, in whose solitudes numerous monasteries and hermitages had sprung up under the zealous promotion of Athanasius himself; and among these he seems to have found refuge. Here he composed many writings which were full of eloquence, to strengthen the faith of the believers or expose the falsehood of his enemies. When Julian the Apostate ascended the throne toleration was proclaimed to all religions, and Athanasius returned to his former position at Alexandria. His next controversy was with the heathen subjects of Julian, who excited the emperor against him, and he was obliged to flee in order to save his life. The death of the emperor and the accession of Jovian (363) again brought him back; but Valens becoming emperor, and the Arians recovering the superiority, he was once more compelled to flee. He

remained concealed this time for four months, at the end of which period of exile Valens allowed him to return. From this period he remained undisturbed in his office till he died. Of the forty-six years of his official life he spent twenty in banishment, and the greater part of the remainder in defending the Nicene Creed. His writings, which are in Greek, are on polemical, historical, and moral subjects. The polemical treat chiefly of the doctrines of the Trinity, the incarnation of Christ, and the divinity of the Holy Spirit. The historical ones are of the greatest importance for the history of the church. See *Athanasian Creed*.

Atheism (ă'thē-izm; Greek, *a*, priv., and *Theos*, God), the disbelief of the existence of a God or supreme intelligent being; the doctrine opposed to *theism* or *deism*. The term has been often loosely used as equivalent with *infidelity* generally, with *deism*, with *pantheism*, and with the denial of immortality.

Atheling (ath'el-ing), a title of honor among the Anglo-Saxons, meaning one who is of noble blood. The title was gradually confined to the princes of the blood royal, and in the ninth and tenth centuries is used exclusively for the sons or brothers of the reigning king.

Atheling, EDGAR. See *Edgar Atheling*.

Athelney (ath'el-ni), formerly an island in the midst of fens and marshes, now drained and cultivated, in Somersetshire, England, about 7 miles southeast of Bridgewater. Alfred the Great took refuge in it during a Danish invasion, and afterwards founded an abbey there.

Athelstan (ath'el-stan), King of England, born 895; died 940, succeeded his father, Edward the Elder, in 925. He was victorious in his wars with the Danes of Northumberland, and the Scots, by whom they were assisted. After a signal overthrow of his enemies at Brunanburgh he governed in peace and with great ability.

Athens, or **ATHENE** (ă-thē'na, ă-thē'nē), a Greek goddess, identified by the Romans with Minerva, the representative of the intellectual powers; the daughter of Zeus (Jupiter) and Mētis (that is, wisdom or cleverness). According to the legend, which is perhaps allegorical, before her birth Zeus swallowed her mother, and Athens afterwards sprang from the head of Zeus with a mighty war shout and in complete armor. In her character of a wise and prudent warrior she was contrasted with the fierce

Ares (Mars). In the wars of the giants she slew Pallas and Enceladus. In the wars of the mortals she aided and protected heroes. She is also represented as the patroness of the arts of peace. The sculptor, the architect, and the painter, as well as the philosopher, the orator, and the poet, considered her their tutelary deity. She is also represented among the healing gods. In all these representations she is the symbol of the thinking faculty, the goddess of wisdom, science, and art; the latter, however, only in so far as invention and thought are comprehended. In the images of the goddess a manly gravity and an air of reflection are united with female beauty in her features. As a warrior she is represented completely armed, her head covered with a gold helmet. As the goddess of peaceful arts she appears in the dress of a Grecian matron. To her insignia belong the Ægis, the Gorgon's head, the round Argive buckler; and the owl, the cock, the serpent, an olive branch, and a lance were sacred to her. All Attica, but particularly Athens, was sacred to her, and she had numerous temples there. Her most brilliant festival at Athens was the Panathenæa.

Athenæum (ath-e-nē-um), the temple of Athena, or Minerva, at Athens, frequented by poets, learned men, and orators. The same name was given at Rome to the school which Hadrian established on the Capitoline Mount for the promotion of literary and scientific studies. In modern times the same name is given to literary clubs and establishments connected with the sciences.

Athenæus (ath-e-nē-us), a Greek rhetorician and grammarian, who lived at the end of the second and beginning of the third century after Christ, author of an encyclopedic work, in the form of conversation, called *Discussions on Dinners*, etc., (*Deipnosophistæ*), which is a rich but ill-arranged treasure of historical, antiquarian, philosophical, grammatical, etc., knowledge.

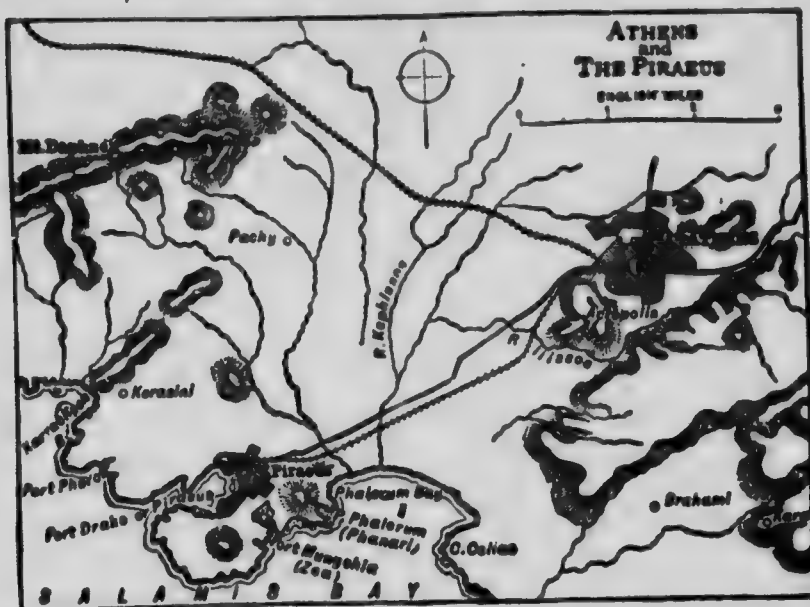
Athenagoras (ath-en-ag'or-as), a Platonic philosopher of Athens, a convert to Christianity, who wrote a Greek Apology for the Christians, addressed to the Emperor Marcus Aurelius, in 177, one of the earliest that appeared.

Ath'ens (Gr. *Athēnai*, L. *Athenæ*), anciently the capital of Attica and center of Greek culture, now the capital of the Kingdom of Greece. It is situated in the central plain of Attica, about 4 miles from the Saronic Gulf or Gulf of Ægina, an arm of the Ægean Sea running in between the mainland and

Athens

Athens

the Peloponnesus. It is said to have been founded about 1550 B. C. by Cecrops, the mythical Pelasgian hero, and to have boundary as the sites of its chief public buildings, the city itself, however, afterwards taking a northerly direction. On



borne the name Cecropia until under Erechtheus it received the name of Athens, in honor of Athênê. The Acropolis, an irregular oval crag 500 ft. high, with a level summit 1000 ft. long by 500 in breadth, was the original nucleus of

the east ran the Ilissus and on the west the Cephissus, while to the southwest lay three harbors—Phalerum, the oldest and nearest; the Piræus, the most important; and Munychia, the Piræan Acropolis. The architectural development of Athens



The Acropolis at Athens

the city. The three chief eminences near the Acropolis—the Areopagus to the northwest, the Pnyx to the southwest, and the Museum to the south of the Pnyx—were thus included within the city

may be dated from the rule of the Pisistratids (560-510 B. C.), who are credited with the foundation of the huge temple of the Olympian Zeus, completed by Hadrian seven centuries later, the erection of the

Pythium or temple of Pythian Apollo, and of the Lyceum or temple of Apollo Lyceus—all near the Ilissus.

With the foundation of Athenian democracy under Clisthenes, the Pnyx or place of public assembly, with its semi-circular area and cy'opean wall, first became of importance, and a commencement was made to the Dionysiac theater (theater of Dionysus or Bacchus) on the south side of the Acropolis.

Shortly after the destruction wrought by the Persians in 480 B. C. Themistocles reconstructed the city upon practical lines and with a larger area, inclosing the city in new walls $7\frac{1}{2}$ miles in circumference, erecting the north wall of the Acropolis, and developing the maritime resources of the Piræus; while Cimon added to the southern fortifications of the Acropolis, placed on it the temple of Nike Apteros, planted the Agora with trees, laid out the Academy, and built the Theseum on an eminence north of the Areopagus. Here were the Leucorium, and the far-famed Stoa Poecile, a hall with walls covered with paintings (whence the *Stoics* got their name). Under Pericles the highest point of artistic development was reached. An Odeum was erected on the east of the Dionysiac theater for the recitations of rhapsodists and musicians; and with the aid of the architects Ictinus and Mnesicles and of the sculptor Phidias the work on the Acropolis was perfected. Covering the whole of the western end rose the Propylæa, of Pentelic marble and consisting of a central portico with two wings in the form of Doric temples. Within, to the left of the entrance, stood the bronze statue of Athena Promachus, and beyond it the Erechtheum, containing the statue of Athena Polias; while to the right, on the highest part of the Acropolis, was the marble Parthenon or temple of Athena, the crowning glory of the whole. Minor statues and shrines occupied the rest of the area, which was for the time wholly appropriated to the worship of the guardian deities of the city. In the interval between the close of the Peloponnesian war and the battle of Chæronea few additions were made. Then, however, the long walls and Piræus, destroyed by Lysander, were restored by Conon, and under the orator Lycurgus the Dionysiac temple was completed, the Panathenaic stadium commenced, and the choragic monuments of Lysicrates and Thrasyllus erected. Later on Ptolemy Philadelphus gave it the Ptolemæum near the Theseum, Attalus I the stoa northeast of the Agora, Eumenes II that near the great theater,

and Antiochus Epiphanes carried on the Olympium. Under the Romans it continued a flourishing city, Hadrian in the second century adorning it with many new buildings. Indeed Athens was at no time more splendid than under the Antonines, when Pausanias visited and described it. But after a time Christian zeal, the attacks of barbarians, and robberies of collectors made sad inroads among the monuments. About 420 A.D. paganism was totally annihilated at Athens, and when Justinian closed even the schools of the philosophers, the reverence for buildings associated with the names of the ancient deities and heroes was lost. The Parthenon was turned into a church of the Virgin Mary, and St. George stepped into the place of Theseus. Finally, in 1456, the place fell into the hands of the Turks. The Parthenon became a mosque, and in 1687 was greatly damaged by an explosion at the siege of Athens, by the Venetians. Enough however, remains of it and of the neighboring structures to abundantly attest the splendor of the Acropolis; while of the other buildings of the city, the Theseum and Horologium, or Temple of the Winds, are admirably preserved, as also are the Pnyx, Panathenaic stadium, etc. Soon after the commencement of the war of liberation in 1821 the Turks surrendered Athens, but captured it again in 1826-27. It was then abandoned until 1830. In 1835 it became the royal residence, and made rapid progress. The modern city mostly lies northwards and eastwards from the Acropolis, and consists mainly of straight and well-built streets. Among the principal buildings are the royal palace, a stately building with a façade of Pentelic marble (completed 1843), the university, the academy, public library, theater, and observatory. The university was opened in 1836, and has 1400 students. There are valuable museums, in particular the National Museum and that in the Polytechnic School, which embraces the Schliemann collection, etc. These are constantly being added to by excavations. There are four foreign archæological schools or institutes, the French, German, American, and British. The vast stadium, or race-course, has recently been rebuilt in magnificent style, the material being Pentelic marble. In 1906 the athletic games of ancient Greece were resumed in this new stadium, including the famous Marathon runs. Pop. 167,479.

Athens, the name of many places in the United States, the chief being the capital of Clarke Co., Georgia, on the Oconee River, 92 miles W. N. W. of

Augusta. It is the seat of the University of Georgia, the State College of Agriculture, State Normal School and other educational institutions. Cotton is largely shipped from this place, and there are cotton, woolen and other mills. Pop. 14,913.

Atherine (ath'er-ən; *Atherin*), the name of a genus of small fishes abundant in the Mediterranean and caught in British waters, some of them being highly esteemed as food.

Atherstone (ath'er-stōn), a town in Warwickshire, England, the reputed birthplace of the poet Drayton.

Atherton (ath'er-ton), a town of England, Lancashire, 18 miles N. W. of Manchester; has cotton factories, collieries, iron-works, etc. Pop. 16,211.

Atherton, GERTRUDE F., author; born at San Francisco, California. Has written many novels, including *The Doomsdayman*; *His Fortunate Grace*; *Senator North*; *The Aristocrats*, *The Conqueror*—this dealing with the career of Alexander Hamilton.

Athletes (ath'lēts; Gr. *athlētai*), combatants who took part in the public games of Greece. The profession was an honorable one; tests of birth, position, and character were imposed, and crowns, statues, special privileges, and pensions were among the rewards of success.—*Athletic sports*, if they do not hold such an honorable position to-day as they did in antiquity, are still practised with great enthusiasm and excite the keenest interest in their patrons. Among them are running, jumping, rowing, swimming, cycling, cricket, baseball, football, wrestling, throwing the hammer, putting the shot, etc.

Athlone (ath-lōn), a town of Ireland, divided by the Shannon into two parts, one in Westmeath, the other in Roscommon; about 76 miles west of Dublin. Its central position has made it one of the chief military depôts, and four railways meet. Pop. about 7,000.

Athol (ath'ol), a town of Worcester Co., Massachusetts, 28 miles from Worcester. It has large manufactures of woollens, boots and shoes, etc. Pop. 8,536.

Ath'ol, or **ATHOLE**, a mountainous and romantic district in the north of Perthshire, Scotland, giving the title to a duke of the Murray family.

Athor (ā'thōr), **HATHOR**, or **HET-HET**, an Egyptian goddess, identified with Aphrodite or Venus. Her symbol was the cow bearing on its head the solar disc and hawk-feather plumes. She

had a great number of local forms and names, and is often confounded with Isis, whose symbol was likewise the solar disk.

Athos (ath'os; now *Hagion Oros* or *Monte Santo*, that is, Holy Mountain), a mountain 6700 feet high, in European Turkey, terminating the most eastern of the three peninsulas jutting into the Archipelago. The name, however, is frequently applied to the whole peninsula, which is about 30 miles long by 5 broad. It is covered with forests, and plantations of olive, vine, and other fruit trees. Both the surface and coastline are irregular. The Persian fleet under Mardonius was wrecked here in 492 B.C., and to avoid a similar calamity Xerxes caused a canal, of which traces may yet be seen, to be cut through the isthmus that joins the peninsula to the mainland. On the peninsula there are situated about twenty monasteries and a multitude of hermitages, which contain from 6000 to 8000 monks and hermits of the order of St. Basil. The libraries of the monasteries are rich in literary treasures and manuscripts. Every nation belonging to the Greek Church has here one or more monasteries of its own, which are annually visited by pilgrims. The various religious communities form a species of republic, paying an annual tribute of nearly \$20,000 to the Turks, and governed by a synod of twenty monastic deputies and four presidents meeting weekly. The privileges which the establishments enjoy they owe to Murad II, who on account of their voluntary submission, even before the capture of Constantinople, granted them his protection. The revenue of the community is derived from pilgrims, and from a considerable trade in amulets, rosaries, crucifixes, images, and wooden furniture, which are manufactured by the monks.

Athy (ath-i'), a town in Ireland, county of Kildare, 37 miles southwest of Dublin, on the Barrow, which is here joined by the Grand Canal. Its chief trade is in corn. Pop. about 5000.

Atitlan (ā-tē'tlān), a lake and mountain of Central America in Guatemala. The lake is about 24 miles long and 10 broad; the mountain is an active volcano 12,160 ft. high. The lake has no visible outlet and is of great depth, no soundings being obtainable with a line of 1000 ft. Mineral springs abound in the neighborhood.

Atlanta (at-lan'ta), a city, capital of Georgia, on a elevated ridge, 7 miles S. E. of the Chatahoochee River. It is an important railroad center; carries on a large trade in grain, paper, cotton, flour, and especially tobacco, and possesses flour-mills, paper-mills, iron-

works, and various other manufacturing establishments. Here are Atlanta University for colored male and female students, a theological college, a medical college, etc. Atlanta suffered severely during the Civil war. Important expositions were held here in 1881 and 1895. Pop. 154,839.

Atlantes (at-lan'tēs), or TELAMONES, in architecture, male figures used in place of columns or pilasters for



Atlantes.

the support of an entablature or cornice. Female figures, *caryatides*.

Atlantic (at-lan'tik), capital of Cass Co., Iowa. It is the center of a wide agricultural region. Pop. 5,046.

Atlantic City, a popular seaside resort of New Jersey, 60 miles S.E. of Philadelphia. It has 1000 hotels and boarding houses, accommodating 350,000 guests and a twelve-mile boardwalk along the sea. Pop. 52,000.

Atlantic Ocean, the vast expanse of sea lying between the west coasts of Europe and Africa and the east coasts of North and South America, and extending from the Arctic to the Antarctic Ocean; greatest breadth, between the west coast of Northern Africa and the east coast of Florida, 4150 miles; least breadth, between Norway and Greenland, 930 miles; superficial extent, 25,000,000 square miles. The principal inlets and bays are Baffin and Hudson Bays, the Gulf of Mexico, the Caribbean Sea, the North Sea or German Ocean, the Bay of Biscay, the Mediterranean Sea, and the Gulf of Guinea. The principal islands north of the equator are Iceland, the Faroe and British Islands, the Azores, Canaries, and Cape Verde Islands, Newfoundland, Cape Breton, and the West India Islands; and south of the equator, Ascension, St. Helena, and Tristan da Cunha.

The great currents of the Atlantic are

the Equatorial Current (divisible into the Main, Northern, and Southern Equatorial Currents), the Gulf-stream, the North African and Guinea Current, the Southern Connecting Current, the Southern Atlantic Current, the Cape Horn Current, Rennel's Current, and the Arctic Current. The current system is primarily set in motion by the trade-winds which drive the water of the inter-tropical region from Africa towards the American coasts. The main Equatorial Current, passing across the Atlantic, is turned by the South American coast, along which it runs at a rate of 30 to 50 miles a day, till, having received part of the North Equatorial Current, it enters the Gulf of Mexico. Issuing thence between Florida and Cuba under the name of the Gulf-stream, it flows with a gradually expanding channel nearly parallel to the coast of the United States. It then turns northeastward into the mid-Atlantic, the larger proportion of it passing southward to the east of the Azores to swell the North African and Guinea Current created by the northerly winds off the Portuguese coast. The Guinea Current, which takes a southerly course, is divided into two on arriving at the region of the northeast trades, part of it flowing east to the Bight of Biafra and joining the South African feeder of the Main Equatorial, but the larger portion being carried westward into the North Equatorial drift. Rennel's Current, which is possibly a continuation of the Gulf-stream, enters the Bay of Biscay from the west, curves round its coast, and then turns northwest towards Cape Clear. The Arctic Current runs along the east coast of Greenland (being here called the Greenland Current), doubles Cape Farewell, and flows up towards Davis Strait; it then turns to the south along the coasts of Labrador and the United States, from which it separates the Gulf-stream by a cold band of water. Immense masses of ice are borne south by this current from the polar seas. In the interior of the North Atlantic there is a large area comparatively free from currents, called the Sargasso Sea, from the large quantity of sea weed (of the genus *Sargassum*) which drifts into it. A similar area exists in the South Atlantic. In the South Atlantic, the portion of the Equatorial Current which strikes the American coast below Cape St. Roque flows southward at the rate of from 12 to 20 miles a day along the Brazil coast under the name of the Brazil Current. It then turns eastward and forms the South Connecting Current, which, on reaching the South African coast, turns north-

ward into the Main and Southern Equatorial Currents. Besides the surface currents, an under current of cold water flows from the poles to the equator, and an upper current of warm water from the equator towards the poles.

The greatest depth yet discovered is north of Porto Rico, in the West Indies, namely 27,360 feet. Cross-sections of the North Atlantic between Europe and America show that its bed consists of two great valleys lying in a north-and-south direction, and separated by a ridge, on which there is an average depth of 1600 or 1700 fathoms, while the valleys on either side sink to the depth of 3000 or 4000 fathoms. A ridge, called the *Wyville-Thomson Ridge*, with a depth of little more than 200 fathoms above it, runs from near the Butt of Lewis to Iceland, cutting off the colder water of the Arctic Ocean from the warmer water of the Atlantic. The South Atlantic, of which the greatest depth yet found is over 3000 fathoms, resembles the North Atlantic in having an elevated plateau or ridge in the center with a deep trough on either side. The saltiness and specific gravity of the Atlantic gradually diminish from the tropics to the poles, and also from within a short distance of the tropics to the equator. There is yet much to be discovered regarding the salinity of the water below the surface of both the North and South Atlantic. The North Atlantic is the greatest highway of ocean traffic in the world. It is also a great area of submarine communication, by means of the telegraphic cables that are laid across its bed.

Atlantides (at-lan'ti-dēz), a name given to the Pleiades, which were fabled to be the seven daughters of Atlas or of his brother Hesperus.

Atlantis (at-lan'tis), an island which, according to Plato, existed in the Atlantic over against the Pillars of Hercules (Straits of Gibraltar), was the home of a great nation and was finally swallowed up by the sea. The legend has been accepted by some as fundamentally true; but others have regarded it as the outgrowth of some early discovery of the New World.

Atlantosaurus (at-lan'tō-sq-rus), a gigantic fossil reptile, order Dinosauria, obtained in the upper Jurassic strata of the Rocky Mountains, attaining a length of 80 feet or more.

At'las, an extensive mountain system in North Africa, starting near Cape Nun, on the Atlantic Ocean, traversing Morocco, Algiers, and Tunis, and terminating on the coast of the Mediterranean; divided generally into two

parallel ranges, running w. to e., the Greater Atlas lying towards the Sahara and the Lesser Atlas towards the Mediterranean. The principal chain is about 1500 miles long, and the principal peaks rise above or approach the line of perpetual congelation, some of the mountain tops in Morocco rising to a height of over 14,000 feet. Silver, antimony, lead, copper, iron, etc., are among the minerals. The vegetation is chiefly European in character, except on the low grounds and next the desert. Dense forests exist on the northern slopes, while the southern flanks are mainly destitute of vegetation.

Atlas, in Greek mythology, the name of a Titan whom Zeus condemned to bear the vault of heaven. The same name is given to a collection of maps and charts, and was first used by General Mercator in the sixteenth century, the figure of Atlas bearing the globe being given on the title-pages of such works.

Atlas, in anatomy, is the name of the first vertebra of the neck, which supports the head. It is connected with the occipital bone in such a way as to permit of the nodding movement of the head, and rests on the second vertebra or *axis*, their union allowing the head to turn from side to side.

Atmidometer (at-mi-dom'e-tēr), an instrument for measuring the evaporation from water, ice, or snow. It somewhat resembles Nicholson's hydrometer, being constructed so as to float in water and having an upright graduated stem, on the top of which is a metal pan. Water, ice, or snow is put into the pan, so as to sink the zero of the stem to a level with the cover of the vessel, and as evaporation goes on the stem rises, showing the amount of evaporation in grains.

Atmometer (at-mom'e-tēr), an instrument for measuring the amount of evaporation from a moist surface in a given time. It is often a thin hollow ball of porous earthenware in which is inserted a graduated glass tube. The cavity of the ball and tube being filled with water and the top of the tube closed, the instrument is exposed to the free action of the air; the relative rapidity with which the water transuding through the porous substance is evaporated is marked by the scale on the tube as the water sinks.

Atmosphere (at'mos-fēr), primarily the gaseous envelope which surrounds the earth; but the term is applied to that of any orb. The atmosphere of the earth consists of a mass of gas extending to a height which has been variously estimated at from 45 to several hundred miles, possibly 500, and bearing

on every part of the earth's surface with a pressure of about 15 (14.73) lbs. per square inch. The existence of this atmospheric pressure was first proved by Torricelli, who thus accounted for the rush of a liquid to fill a vacuum, and, working out the idea produced the first barometer. The average height of the mercurial column counterbalancing the atmospheric weight at the sea-level is a little less than 30 inches; but the pressure varies from hour to hour, and, roughly speaking, diminishes geometrically with the arithmetical increase in altitude. Of periodic variations there are two maxima of daily pressure occurring, when the temperature is about the mean of the day, and two minima, when it is at its highest and lowest, respectively; but the problems of diurnal and seasonal oscillations have yet to be fully solved. The pressure upon the human body of average size is no less than 14 tons, but as it is exerted equally internally and externally no inconvenience is caused by it. It is customary to take the atmospheric pressure as the standard for measuring other fluid pressures; thus the steam pressure of 30 lbs. per square inch on a boiler is spoken of as a pressure of two atmospheres.

The atmosphere, first subjected to analysis by Priestley and Scheele in the latter part of the eighteenth century, consists essentially of a mixture of oxygen and nitrogen in the almost constant proportion of 20.81 volumes of oxygen to 79.19 volumes of nitrogen, or, by weight, 23.01 parts of oxygen to 76.99 of nitrogen. The gases are associated together, not as a chemical compound, but as a mechanical mixture. Upon the oxygen present depends the power of the atmosphere to support combustion and respiration, the nitrogen acting as a diluent to prevent its too energetic action. Besides these gases, the air contains a small but constant percentage of carbonic acid gas, essential to plant life, also variable quantities of aqueous vapor and ozone, with minute amounts of argon and some other gases.

It also has ozone, traces of ammonia, and, in towns, sulphuretted hydrogen and sulphurous acid gas. After thunderstorms, nitric acid is also observable. In addition to its gaseous constituents the atmosphere is charged with minute particles of organic and inorganic matter.

Atmospheric Electricity, the electricity manifested by the atmosphere, and made sensibly observable in the lightning flash.

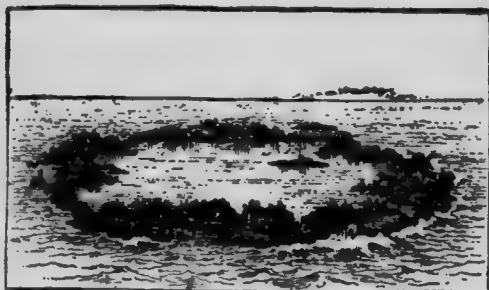
Atmospheric Engine. See *Air engine*.

Atmospheric Railway, so called in consequence of the motive power being derived from the expansive force of compressed air. The idea of thus obtaining motion was first suggested by the French engineer Papin, about 200 years ago. In 1810, and again in 1827, Mr. Medhurst published a scheme for 'propelling carriages through a close-fitting air-tight tunnel by forcing in air behind them'; and in 1825 a similar project was patented by Mr. Vallance, of Brighton. About 1835 Mr. H. Pinkus, an American residing in England, patented a pneumatic railway. The carriages were to travel on an open line of rails, along which a cast-iron tube of between 3 and 4 feet diameter was to be laid, having a longitudinal slit from 1 to 2 inches wide and closed by a flexible valve along its upper side, through which a connection could be formed between the leading carriage and a piston working within the tube. This method was improved by Messrs. Clegg and Samuda, who in 1840 tried some experiments on a portion of the West London Railway with sufficient success to induce the government to advance a loan to the Dublin and Kingstown Railway Company, for the construction of a pneumatic line from Kingstown to Dalkey. It was opened for passenger traffic at the end of 1843, and was worked for many months. The London and Croydon Company subsequently obtained powers for laying down an atmospheric railway by the side of their other line from London to Croydon, and in experimental trips in 1845 a speed of 30 miles an hour was obtained with sixteen carriages, and of 70 miles with six carriages. But during the intense heat of the summer of 1846 the iron tube frequently became so hot as to melt the composition which sealed the valve, and the line had to be worked by locomotives. The mechanical difficulty of commanding a sufficient amount of rarefaction led to the abandonment of the system for railway purposes. An analogous system is now in use for the conveyance of letters and parcels in towns by means of tubes of moderate diameter laid beneath the streets. See *Pneumatic Despatch*.

Atoll (at'ol, a-tol'), the Polynesian name for coral islands of the ringed type inclosing a lagoon in the center. They are found numerous in the Pacific in archipelagos, and are occasionally of large size. Suadiva Atoll is 44 miles by 34; Rimsky is 54 by 20. See *Coral*.

Atomic (a-tom'ik) **THEORY**, a theory as to the existence and properties of atoms (see *Atoms*); especially, in

chemistry, the theory accounting for the fact that in compound bodies the elements combine in certain constant proportions, by assuming that all bodies are composed of ultimate atoms, the weight of which is different in different kinds of



Bird's-Eye View of an Atoll

matter. It is associated with the name of Dalton, who systematized and extended the imperfect results of his predecessors. On its practical side the atomic theory asserts three *Laws of Combining Proportions*: (1) The law of Constant or Definite Proportions, teaching that in every chemical compound the nature and proportion of the constituent elements are definite and invariable; thus, water invariably consists of 8 parts by weight of oxygen to 1 part by weight of hydrogen; (2) The Law of Combination in Multiple Proportions, according to which the several proportions in which one element unites with another invariably bear towards each other a simple relation; thus 1 part by weight of hydrogen unites with 8 parts by weight of oxygen to form water, and with 16 parts (i.e., 8×2) parts of oxygen to form peroxide of hydrogen; (3) The Law of Combination in Reciprocal Proportions, that the proportions in which two elements combine with a third also represent the proportions in which, or in some simple multiple of which, they will themselves combine; thus in olefiant gas hydrogen is present with carbon in the proportion of 1 to 6, and in carbonic oxide oxygen is present with carbon in the proportion of 8 to 6, being also the proportions in which hydrogen and oxygen combine with each other. The theory that these *proportional numbers* are, in fact, nothing else than the relative weights of atoms so far accounts for the phenomena that the existence of these laws might have been predicted by the aid of the atomic hypothesis long before they were actually discovered by analysis. In themselves,

however, the laws do not prove the theory of the existence of ultimate particles of matter of a certain relative weight; and although many chemists, even without expressly adopting the atomic theory itself, have followed Dalton in the use of the terms *atom* and *atomic weight*, in preference to *proportion*, *combining proportion*, *equivalent*, and the like, yet in using the word *atom* it should be held in mind that it merely denotes the proportions in which elements unite. These will remain the same whether the atomic hypothesis which suggested the employment of the term be true or false. Dalton supposed that the atoms of bodies are spherical, and invented certain symbols to represent the mode in which he conceived they might combine together.

Atomic Weights. See *Chemistry*.

Atoms (at'oms), according to the hypothesis of some philosophers, the primary parts of elementary matter not further divisible. The principal theorists of antiquity upon the nature of atoms were Moschus of Sidon, Leucippus (510 B.C.), Democritus, Epicurus, and Lucretius. These philosophers explained all phenomena on the theory of the existence of atoms possessing various properties and motions, and are hence sometimes called *Atomists*. Among the moderns, Gassendi illustrated the doctrine of Epicurus. Descartes formed from this his system of the vortices. Newton and Boerhaave supposed that the original matter consists of hard, ponderable, impenetrable, inactive, and immutable particles, from the variety in the composition of which the variety of bodies originates. According to Boscovich, every atom is an indivisible point possessing position, mass, and potential force or capacity for attraction and repulsion. Sir W. Thomson (Lord Kelvin) recently offered the suggestion that atoms are vortices in an incompressible fluid; but he found this view inadmissible and the latest and most probable theory is that atoms consist of a large number of very minute rotating particles, known as electrons. Of these there are estimated to be as many as 1800 in the atom of hydrogen, the smallest known, and proportionate numbers in larger atoms, the electrons being all of one size. The theory is sustained by a number of suggestive facts and discoveries.

Atonement (a-tōn'ment), in Christian theology, the expiation of sin by the obedience and personal sufferings of Christ. The first explicit exposition of the evangelical doctrine of the

atonement is ascribed to Anselm, Archbishop of Canterbury, in 1093.

Atrato (ä-trä'tō), a river of S. America, in the northwest of Colombia, emptying itself by nine mouths into the Gulf of Darien; it is navigable by steamers of some size for 250 miles, and was long the subject of undertakings for establishing water communication between the Atlantic and Pacific.

Atrauli (a-trow'li), a town of India, N. W. Provinces, Aligarh district, clean, well built, and with a good trade. Pop. 14,374.

Atreates (a-treb'a-tēz), ancient inhabitants of that part of Gallia, Belgica, afterwards called Artois. A colony of them settled in Britain, in a part of Berkshire and Oxfordshire.

Atrek (ä-trek'), a river of Asia, forming the boundary between Persia and the Russian Transcaspian territory, and flowing into the Caspian; length 250 miles.

Atrous (at'rūs), in Greek mythology, a son of Pelops and Hippodamia, grandson of Tantälus and progenitor of Agamemnon. He succeeded Eurystheus, his father-in-law, as King of Mycēna, and in revenge for the seduction of his wife by his brother Thyestes gave a banquet at which the latter partook of the flesh of his own sons. Atrous was killed by Ægisthus, a son of Thyestes. The tragic events connected with this family furnished materials to some of the great Greek dramatists.

Atriplex (at'ri-pleks), a genus of plants, nat. order Chenopodiaceæ.

See *Orache*.

Atrium (ä'tri-um), the entrance-hall and most important apartment of a Roman house, generally ornamented with statues, family portraits, and other pictures, and forming the reception-room for visitors and clients. It was lighted by the *compluvium*, an opening in the roof, towards which the roof sloped so as to throw the rain-water into a cistern in the floor called the *impluvium*.

In zoölogy the term is applied to the large chamber or 'cloaca' into which the intestine opens in the Tunicata.

Atropa (at'rō-pa), the nightshade genus of plants. See *Belladonna*.

Atrophy (at'rō-fi), a wasting of the flesh due to some interference with the nutritive processes. It may arise from a variety of causes, such as permanent, oppressive, and exhausting passions, organic disease, a want of proper food or of pure air, suppurations in important organs, copious evacuations of blood, saliva, semen, etc., and it is

also sometimes produced by poisons, for example arsenic, mercury, lead, in miners, painters, gilders, etc. In old age the whole frame except the heart undergoes atrophic change, and it is of frequent occurrence in infancy as a consequence of improper, unwholesome food, exposure to cold, damp, or impure air, etc. Single organs or parts of the body may be affected irrespective of the general state of nutrition; thus local atrophy may be superinduced by palsies, the pressure of tumors upon the nerves of the limbs, or by artificial pressure, as in the feet of Chinese ladies.

Atropin, Atropine (at'rō-pin), a crystalline alkaloid obtained from the deadly nightshade (*Atropa Belladonna*). It is very poisonous, and produces persistent dilatation of the pupil.

Atropos (at'rō-pos), the eldest of the Fates, who cuts the thread of life with her shears.

Attacapa Indians (ä-tak'a-pa), a tribe found on the borders of the Gulf of Mexico, in Louisiana and Texas. They were called Attacapas (man-eat' by the Choctaws. After the cession of Louisiana to the United States in 1803 they became extinct.

Attaché (at'a-shä), a junior member of the diplomatic service attached to an embassy or legation.

Attachment (a-tach'ment), in law, the taking into the custody of the law the person or property of one already before the court, or of one whom it is sought to bring before it.—*Attachment of person.* A writ issued by a court of record, commanding the sheriff to bring before it a person who has been guilty of contempt of court, either in neglect or abuse of its process or of subordinate powers.—*Attachment of property.* A writ issued at the institution or during the progress of an action, commanding the sheriff or other proper officer to attach the property, rights, credits, or effects of the defendant to satisfy the demands of the plaintiff. The laws and practice concerning the attachment vary in different States.

Attack (a-tak'), the opening act of hostility by a force seeking to dislodge an enemy from its position. It is considered more advantageous to offer than to wait attack, even in a defensive war. The historic forms of attack are: 1. The parallel; 2. The form in which both the wings attack and the center is kept back; 3. The form in which the center is pushed forward and the wings kept back; 4. The famous oblique mode, dating at least from Epaminondas, and

Attainder

employed by Frederick the Great, where one wing advances to engage, while the other is kept back, and occupies the attention of the enemy by pretending an attack. Napoleon preferred to mass heavy columns against an enemy's center. The forms of attack have changed with the weapons used. In the days of the pike heavy masses were the rule, but the use of the musket led to an extended battle-front to give effect to the fire. The nature of the attack depends upon the condition and position of the enemy, upon the purpose of the war, upon the time, place, and other circumstances.

Attainder (a-tān'dér), the legal consequences of a sentence of death or outlawry pronounced against a person for treason or felony, the person being said to be *attainted*. It resulted in forfeiture of estate and 'corruption of blood,' rendering the party incapable of inheriting property or transmitting it to heirs; but these results now no longer follow. Attainder is wholly unknown in the laws of the United States; the Constitution prohibits it (Art. I, Sect. 9).

Attaint (a-tānt'), a writ at common law against a jury for a false verdict, never adopted in the United States.

Attalea (at-a-lé'a), a genus of American palms, comprising the piasava palm, which produces coquilla-nuts.

Attalus (at'a-lus), the names of three kings of ancient Pergamus, 241-133 B.C., the last of whom bequeathed his kingdom to the Romans. They were all patrons of art and literature.

Attar (at'ar), in the East Indies, a general term for a perfume from flowers; in Europe generally used only of the *attar* or *otto* of roses, an essential oil made from *Rosa centifolia*, the hundred-leaved or cabbage-rose, *R. damascēna* or damask-rose, *R. moschāta* or musk-rose, etc., 100,000 roses yielding only 180 grains of attar. Cashmere, Shiraz, and Damascus are celebrated for its manufacture, and there are extensive rose farms in the valley of Kezanlik in Roumelia and at Ghazipur in Benares. The oil is at first greenish, but afterwards it presents various tints of green, yellow, and red. It is concrete at all ordinary temperatures, but becomes liquid about 84° Fahr. It consists of two substances, a hydrocarbon and an oxygenated oil, and is frequently adulterated with the oils of rhodium, sandal-wood, and geranium, with the addition of camphor or spermaceti. It is used in making hair oil, in lavender water and other perfumes, its strength being such that a few drops suffice.

Attenuation (a-ten'ū-a-shun), in brewing, the change which takes place in the saccharine wort during fermentation by the conversion of sugar into alcohol and carbonic acid, with diminution of specific gravity.

Atterbury (at'er-be-ri), FRANCIS, an English prelate, born in 1662, and educated at Westminster and Oxford. In 1687 he took his degree of M.A., and appeared as a controversialist in a defense of Luther, entitled *An Answer to Some Considerations on the Spirit of Martin Luther*, etc. He also assisted his pupil, the Hon. Mr. Boyle, in his famous controversy with Bentley on the *Epistles of Phalaris*. Having taken orders in 1687 he settled in London, became chaplain to William and Mary, preacher of Bridewell, and lecturer of St. Bride's. Controversy was congenial to him, and in 1706 he commenced one with Dr. Wake, which lasted four years, on the rights, privileges, and powers of convocations. For this service he received the thanks of the lower house of convocation and the degree of Doctor of Divinity from Oxford. Soon after the accession of Queen Anne he was made Dean of Carlisle, aided in the defense of the famous Sacheverell, and wrote *A Representation of the Present State of Religion*. In 1712 he was made Dean of Christ Church, and in 1714 he distinguished himself by his opposition to George I; and having entered into a correspondence with the Pretender's party was apprehended in August, 1722, and committed to the Tower. Being banished the kingdom, he settled in Paris, where he chiefly occupied himself in study and in correspondence with men of letters. But even here, in 1725, he was actively engaged in fomenting discontent in the Scottish Highlands. He died in 1732.

Atterbury, WILLIAM WALLACE (1866—), an American railway official, born at New Albany, Ind. Graduating from Yale in 1886, he began his railroad work in the Altoona (Pa.) shops as an apprentice, becoming road foreman in 1889. He was master mechanic of the Pennsylvania Co. at Fort Wayne, Ind., from 1893 to 1896; general superintendent of motive power on the lines east of Pittsburgh and Erie, 1896-1903; general manager, 1903-09; vice-president of the Pennsylvania Co. from 1909. In the firemen's dispute of 1913 he served as one of three members of a board of arbitration. On August 6, 1917, he was granted leave of absence to go to France following the entrance of the United States into the European war (q. v.), and was director of construction and operation of the United States mili-

tary railways in France till the close of the war. His work was acknowledged to be of great assistance in the success that attended the operations of the American Expeditionary Force. He was commissioned a brigadier-general of the Army of the United States.

Attic (at'ik), an architectural term variously used. An *Attic base* is a peculiar kind of base, used by the ancient architects in the Ionic order. Examples of its use exist in the work of Palladio, etc. An *Attic story* is a low story in the upper part of a house rising above the main portion of the building. In ordinary language an attic is an apartment lighted by a window in the roof.

Attica (at'i-ka), a State of ancient Greece, the capital of which, Athens, was once the leading city in the world. The territory was triangular in shape, with Cape Sunium (Colonna) as its apex and the ranges of Mounts Cithæron and Parnes as its base. On the north these ranges separated it from Bœotia; on the west it was bounded by Megaris and the Saronic Gulf; on the east by the Ægean. Its most marked physical divisions consisted of the highlands, midland district, and coast district, with the two famous plains of Eleusis and of Athens. The Cephissus and Ilissus, though small, were its chief streams; its principal hills, Cithæron, Parnes, Hymettus, Pentelicus, and Laurium. Its soil has probably undergone considerable deterioration, but was anciently fertile in fruits, and especially of the olive and fig. These are still cultivated as well as the vine and cereals, but Attica is better suited for pasture than tillage. According to tradition the earliest inhabitants of Attica lived in a savage manner until the time of Cecrops, who came B.C. 1550, with a colony from Egypt, taught them all the essentials of civilization, and founded Athens. One of Cecrops' descendants founded eleven other cities in the regions round, and there followed a period of mutual hostility. To Theseus is assigned the honor of uniting these cities in a confederacy, with Athens as the capital, thus forming the Attic State. After the death of Codrus, B.C. 1068, the monarchy was abolished, and the government vested in archons elected by the nobility, at first for life, in 752 B.C. for ten years, and in 683 B.C. for one year only. The severe constitution of Draco was succeeded in 594 by the milder code of Solon, the democratic elements of which, after the brief tyranny of the Pisistratids were emphasized and developed by Clisthenes. He divided the peo-

ple into ten classes, and made the senate consist of 500 persons, establishing as the government an oligarchy modified by popular control. Then came the splendid era of the Persian war, which elevated Athens to the summit of fame. Miltiades at Marathon and Themistocles at Salamis conquered the Persians by land and by sea. The chief external danger being removed, the rights of the people were enlarged; the archons and other magistrates were chosen from all classes without distinction. The period from the Persian war to the time of Alexander (B.C. 500 to 336) was most remarkable for the development of the Athenian constitution. Attica appears to have contained a territory of nearly 850 square miles, with some 500,000 inhabitants, 360,000 of whom were slaves, while the inhabitants of the city numbered 180,000. Cimon and Pericles (B.C. 444) raised Athens to its point of greatest splendor, though under the latter began the Peloponnesian war, which ended with the conquest of Athens by the Lacedæmonians. The succeeding tyranny of the Thirty, under the protection of a Spartan garrison, was overthrown by Thrasybulus, with a temporary partial restoration of the power of Athens; but the battle of Chæronea (B.C. 338) made Attica, in common with the rest of Greece, a dependency of Macedon. The attempts at revolt after the death of Alexander were crushed, and in 260 B.C. Attica was still under the sway of Antigonus Gonatas, the Macedonian king. A period of freedom under the shelter of the Achæan League then ensued, but their support of Mithridates led in B.C. 146 to the subjugation of the Grecian States by Rome. After the division of the Roman Empire Attica belonged to the empire of the East until in A.D. 396 it was conquered by Alaric the Goth and the country devastated. Attica, along with the ancient Bœotia, now forms a nome or province (Attica and Bœotia) of the Kingdom of Greece.

Atticus (at'i-kus), TITUS POMPONIUS, a Roman of great wealth and culture, born 109 B.C., and died 32 B.C. On the death of his father he removed to Athens to avoid participation in the civil war, to which the tribune Sulpicius had fallen a victim. There he so identified himself with Greek life and literature as to receive the surname Atticus. It was his principle never to mix in politics, and he lived undisturbed amid the strife of factions. Sulla and the Marian party, Cæsar and Pompey, Brutus and Antony, were alike friendly to him, and he was in favor with Augustus. Of his close friend-

ship with Cicero proof is given in the series of letters addressed to him by Cicero. He married at the age of 53 and had one daughter, Pomponia, named by Cicero Atticula and Attica. He reached the age of seventy-seven years without sickness, but being then attacked by an incurable disease, ended his life by voluntary starvation. He was a type of the refined Epicurean, and an author of some contemporary repute, though none of his works have reached us.—The name Atticus was given to Addison by Pope, in a well-known passage (Prologue to the Satires addressed to Dr. Arbuthnot).

Attila (at'ti-lā; in German, *Etzel*), the famous leader of the Huns, was the son of Mundzuk, and the successor in conjunction with his brother Bleda, of his uncle Rhuas. The rule of the two leaders extended over a great part of northern Asia and Europe, and they threatened the Eastern Empire, and twice compelled the weak Theodosius II to purchase an inglorious peace. Attila caused his brother Bleda to be murdered (444), and in a short time extended his dominion over all the peoples of Germany and exacted tribute from the eastern and western emperors. The Vandals, the Ostrogoths, the Gepidæ, and a part of the Franks united under his banners, and he speedily formed a pretext for leading them against the Empire of the East. He laid waste all the countries from the Black to the Adriatic Sea, and in three encounters defeated the Emperor Theodosius, but could not take Constantinople. Thrace, Macedonia, and Greece all submitted to the invader, who destroyed seventy flourishing cities; and Theodosius was obliged to purchase a peace. Turning to the west, the 'scourge of God,' as the universal terror termed him, crossed with an immense army the Rhine, the Moselle, and the Seine, came to the Loire, and laid siege to Orleans. The inhabitants of this city repelled the first attack, and the united forces of the Romans under Aetius, and of the Visigoths under their king Theodoric, compelled Attila to raise the siege. He retreated to Champagne, and waited for the enemy in the plains of Chalons. In apparent opposition to the prophecies of the soothsayers the ranks of the Romans and Goths were broken; but when the victory of Attila seemed assured the Gothic prince Thorismond, the son of Theodoric, poured down from the neighboring height upon the Huns, who were defeated with great slaughter. Rather irritated than discouraged, he sought in the following year a new opportunity to seize upon Italy, and demanded Honoria, the sister

of Valentinian III, in marriage, with half the kingdom as a dowry. When this demand was refused he conquered and destroyed Aquileia, Padua, Vicenza, Verona, and Bergamo, laid waste the plains of Lombardy, and was marching on Rome when Pope Leo I went with the Roman ambassadors to his camp and succeeded in obtaining a peace. Attila went back to Hungary, and died on the night of his marriage with Hilda or Ildico (453), either from the bursting of a blood-vessel or by her hand. The description that Jordanes has left us of him is in keeping with his Kalmuck-Tartar origin. He had a large head, a flat nose, broad shoulders, and a short and ill-formed body; but his eyes were brilliant, his walk stately, and his voice strong and well-toned.

Attleborough (at'tl-bur-o), a manufacturing town of Bristol county, Massachusetts, 31 miles s. by w. of Boston. It has water power and extensive manufactures of jewelry, clocks, buttons, and cotton goods. Pop. over 17,000. See *North Attleborough*.

Attock (at'tok), a town and fort in Rawal Pindi district, Punjab, overhanging the Indus at the point where it is joined by the Kabul river. It is at the head of the steam navigation of the Indus, and is connected with Lahore by railway. It is an important post on the military road to the frontier.

Attorney (at-tér-ni), a person appointed to do something for and in the stead and name of another. An attorney may have *general* powers to act for another; or his power may be *special*, and limited to a particular act or acts. A special attorney is appointed by a deed called a *power of attorney*, specifying the acts which he is authorized to do. An *attorney at law* is a person qualified to appear for another before a court of law to prosecute or defend any action on behalf of his client. The rules and qualifications, whereby one is authorized to practice as an attorney in any court, are very different in different countries, and in the different courts of the same country. There are various statutes on this subject in the laws of the several States, and almost every court has certain rules, a compliance with which is necessary in order to authorize any one to appear in court for and represent any party to a suit without specific authority under seal. Women are now admitted as practicing attorneys.

Attorney-general, in England and Ireland, the first law-officer and legal adviser of the crown, acting on its behalf in its revenue and

criminal proceedings, carrying on prosecutions in crimes that have a public character, guarding the interests of charitable endowments, and granting patents. The solicitor-general holds a similar position, and may act in his place. In the United States the attorney-general is a member of the President's cabinet and the head of the department of justice. The individual States have also attorneys-general, who have charge of all legal questions affecting the States.

Attraction (a-trak'shun), the tendency of all material bodies, masses or particles to approach each other, to unite, and to remain united. It was Newton that first determined the laws of this apparent force, though he doubted the existence of any actual attraction. When bodies tend to come together from sensible distances the tendency is termed either the attraction of *gravitation*, *magnetism*, or *electricity*, according to circumstances; when the attraction operates at insensible distances it is known as *adhesion* with respect to surfaces, as *cohesion* with respect to the particles of a body, and as *affinity* when the particles of different bodies tend together. It is by the attraction of gravitation that all bodies fall to the earth when unsupported. Various explanations of the mechanism of gravitation have been attempted, but none has been found satisfactory.

Attrek. See *Atrek*.

Attribute (at'ri-büt), in philosophy, a quality or property of a substance, as whiteness or hardness. A substance is known to us only as a congeries of attributes.

In the fine arts an attribute is a symbol regularly accompanying and marking out some personage. Thus the caduceus, purse, winged hat, and sandals are attributes of Mercury, the trampled dragon of St. George.

Atwood (at'wud), GEORGE, an English mathematician, born 1746; died 1807; best known by his invention, called after him *Atwood's Machine*, for verifying the laws of falling bodies. It consists essentially of a freely moving pulley over which runs a fine cord with two equal weights suspended from the ends. A small additional weight is laid upon one of them, causing it to descend with uniform acceleration. Means are provided by which the added weight can be removed at any point of the descent, thus allowing the motion to continue from this point onward with uniform velocity.

Atys, *ATTYS* (at'is), in classical mythology, the shepherd lover of Cybèle, who, having broken the vow of chastity which he made her, castrated himself. In Asia Minor Atys seems to have been a deity, with somewhat of the same character as Adonis.

Aubagne (ô-bân-yé), a town in France, department of Bouches-du-Rhône, with manufactures of cotton pottery, cloth. Pop. (1906) 6039.

Aubaine, *DROIT D'* (drwâ dô-bân). See *Droit d'Aubaine*.

Aube (ôb), a northeastern French department; area, 2351 sq. miles; pop. 243,670. The surface is undulating and watered by the Aube, etc. The N. and N. W. districts are bleak and infertile, the southern districts remarkably fertile. A large extent of ground is under forests and vineyards, and the soil is admirable for grain, pulse, and hemp. The chief manufactures are worsted and hosiery. Troyes is the capital.—The river Aube, which gives name to the department, rises in Haute-Marne, flows N. W., and after a course of 150 miles joins the Seine.

Aubenas (ôb-nâ), a town of France, dep. Ardèche, with a trade in coal, silk, etc. Pop. (1906) 3976.

Auber (ô-bâr), DANIEL FRANÇOIS ES-PRIT, a French operatic composer; born in 1782, at Caen in Normandy; died at Paris, in 1871. He was originally intended for a mercantile career, but devoted himself to music, studying under Cherubini. His first great success was his opera *La Bergère Châtelaine*, produced in 1820. In 1822 he had associated himself with Scribe as librettist, and other operas now followed in quick succession. Chief among them were *Masaniello*, or *La Muette de Portici* (1828), *Fra Diavolo* (1830), *Lestocq* (1834), *L'Ambassadrice* (1836), *Le Domino Noir* (1837), *Les Diamants de la Couronne* (1841), *Marco Spada* (1853), *La Fiancée du Roi des Garbes* (1864). Despite his success in *Masaniello*, his peculiar field was comic opera, in which his charming melodies, bearing strongly the stamp of the French national character, his uniform grace and piquancy, won him a high place.

Aubervilliers (ô-bâr-vêl-yâ), a suburban locality of Paris, with a fort belonging to the defensive works of the city. Pop. (1906) 33,358.

Aubigné, *MELÉ D'*. See *Merle d'Aubigné*.

Aubin (ô-bân), a town of Southern France, department of Aveyron, 20 miles N. E. of Villefranche; mining district; coal; sulphur, alum, and iron. Pop. 9973.

Aubrey

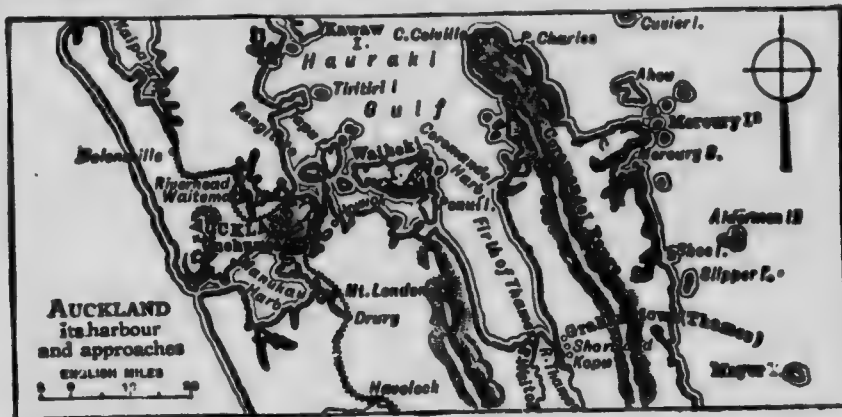
Aubrey (ə'brē), JOHN, an English antiquary, born in Wiltshire in 1625 or 1626, died about 1700. He left large collections of manuscripts, which have been used by subsequent writers. His *Miscellanies* (London, 1696) contain much curious information, but display superstition.

Auburn (ə'burn), the name of many places in the United States, the chief being a city of New York; the county seat of Cayuga Co., in the lake country, at the N. end of Owasco Lake. It is a residential and manufacturing city, with a network of railroad and trolley lines connecting it with sister cities and suburban towns, and with water power, Niagara electric power and gas are procurable at low rates for manufacturing purposes. It is served by the New York Central, Lehigh Valley, and New York, Auburn and Lansing steam railroads, the latter running to Ithaca. Pop. 34,668. An-

the Turks were obliged to retire with great loss. He died at Rhodes in 1503.

Auchmuty (awoh'mū-ti), RICHARD TYLDEN, philanthropist, of Scottish ancestry. In the American civil war he was appointed adjutant-general of volunteers. He earned a justly deserved reputation for his philanthropic movement in establishing trade-schools, among others the New York Trade School, for which he donated \$160,000. He died July 18, 1893.

Auckland (awk'land), a town of New Zealand, in the North Island, founded in 1840, and situated on Waitemata Harbor, one of the finest harbors of New Zealand, where the island is only 6 miles wide, there being another harbor (Manukau) on the opposite side of the isthmus. At dead low water there is sufficient depth in the harbor for the largest steamers. The working ship channel has an average depth of 36 feet, and



other Auburn is in Maine, on the Androscoggin river, 34 miles N. of Portland, a manufacturing city, capital of Androscoggin Co. It has abundant water power, and manufactures of boots and shoes, cotton goods, and furniture. Pop. 15,064.

Aubusson (ə-bu-sōn), a town of the interior of France, dep. Creuse, celebrated for its carpets. Pop. (1906) 6475.

Aubusson (ə-bu-sōn), PIERRE D', grand-master of the Knights of St. John of Jerusalem, born in 1422 of a noble French family, served in early life against the Turks, then entered the order of St. John, obtained a commandery, was made grand-prior, and in 1476 succeeded the Grand-master Orsini. In 1480 the island of Rhodes, the headquarters of the order, was invaded by a Turkish army of 100,000 men. The town was besieged for two months and then assaulted, but

varies in width from 1 to 2 miles. The site is picturesque, the streets spacious, and the public buildings numerous and handsome. It has a large and increasing trade, there being connection with the chief places on the island by rail, and regular communication with the other ports of the colony, Australia, and Fiji by steam. It was formerly the capital. Pop. 120,000.—The provincial district of Auckland forms the northern part of North Island, with an area of 25,746 sq. miles; pop. about 265,000. The surface is very diversified; volcanic phenomena are common, including geysers, hot lakes, etc.; rivers are numerous; wool, timber, kauri-gum, etc., are exported. Much gold has been obtained in the Thames valley and elsewhere.

Auckland, WILLIAM EDEN, LORD, an English statesman, born 1744; educated at Eton and Oxford.

Auckland

called to the bar 1768, under-secretary of state 1772; 1778 served on board of trade; 1778 he was nominated in conjunction with Lord Howe and others to act as a mediator between Britain and the American colonies. He was afterwards secretary of state for Ireland, ambassador extraordinary to France, to the Netherlands, etc. He died in 1814.

Auckland Islands, a group of islands about 180 miles s. of New Zealand, discovered in 1806; and belonging to Britain.

Auction (ak'shun), a public sale to the party offering the highest price. A sale by auction must be conducted in the most open and public manner possible; and there must be no collusion on the part of the buyers. Puffing or mock bidding to raise the value by apparent competition is illegal.

Auction Bridge Whist, a game of cards for four persons, differing from whist chiefly: (1) in that no trump is turned, the declaration of trumps going to the player bidding the highest number of tricks for the privilege. The dealer makes the first bid and each player in turn bids (or passes) until the highest bidder is ascertained [to overbid a declaration, a player must bid either (a) an equal number of tricks of a more valuable declaration or (b) a greater number of tricks]; (2) only three persons actually engage in playing the hand, the cards of the successful bidder's partner being exposed as a dummy hand and played by the final declarer in conjunction with his own; (3) the scoring is unique. A game consists of 30 points, not counting honor scores, which vary in value with the trump declaration and the relative distribution of the honor cards between the two partners who hold a preponderance of honors. Each trick over six is scored as follows: Clubs, 6; diamonds, 7; hearts, 8; spades, 9; no trump, 10. If the declarer is successful in making his bid, he scores all the trick points he actually makes. When declaration is not fulfilled, adversaries score for each trick 50—if doubled, 100; if redoubled, 200. When declarer wins in spite of double he scores, for fulfilling contract, 50, and each extra trick, 50, or if redoubled, for contract 100 and for each extra trick 100. All of this belongs to the honor score. When a hand is doubled every trick over the number contracted for scores double value; if redoubled, four times its value. A grand slam (taking all 13 tricks in a hand) counts 100; a small slam (taking 12 tricks in a hand) 50 on the honor score; 250 points are added for the winning of the rubber, which requires the winning of two games by one side.

Aucuba (a'cu-ba), a genus of plants, order Cornaceae, one species of *A. Japonica*, an Asiatic shrub with evergreen spotted leaves and coral-red berries.

Aude (ôd), a maritime department in the s. of France; area, 2437 sq. miles; mainly covered by hills and traversed w. to e. by the Aude. The loftier districts are unproductive. The wines, especially the white, bear a good name; olives and other fruits are also cultivated. The manufactures are varied; the trade is facilitated by the Canal du Midi. Carcassonne is the capital; other towns are Narbonne and Castelnaudary. Pop. 308,327.—The river Aude rises in the Eastern Pyrenees, and flowing nearly parallel to the Canal du Midi falls into the Mediterranean after a course of 130 miles.

Audebert (ôd-bâr), JEAN BAPTISTE, French engraver and naturalist, born in 1759, died in 1800; published *Histoire Naturelle des Singes, des Makis, et des Galéopitèques; Histoire des Colibris*, etc.; and began *Histoire des Grimpeaux et des Oiseaux de Paradis*, finished by Desray—all finely illustrated works.

Audiphone (a'di-fôn), an acoustic instrument which improves the hearing of partly deaf persons. It consists essentially of a fan-shaped plate of hardened caoutchouc, which is bent to a greater or less degree by strings, and is very sensitive to sound-waves. When used the edge is pressed against the upper front teeth, with the convexity outward, and the sounds being collected are conveyed from the teeth to the auditory nerve without passing through the external ear.

Auditor (a'dit-or), in general practice, an officer of the court appointed to state items of debit and credit between parties in suits when accounts are in question, and show balances. He may be appointed by courts of either law or equity (in the latter case called master or examiner), at common law in actions of account, and in many States, by special statute, in other actions.

Auditory Nerves. See *Ear*.

Audran (ô-drân), GERARD, a celebrated French engraver, born 1640; studied at Rome, was appointed engraver to Louis XIV; died at Paris in 1703. He engraved Le Brun's *Battles of Alexander*, two of Raphael's cartoons, Poussin's *Coriolanus*, etc., and takes a first place among historical engravers. Other members of the family were successful in the same profession: Benoit, 1661-1721; Claude père, 1592-1677; Claude fils, 1640-84; Germain, 1631-1710; Jean, 1667-1756.

Audubon (a'dô-bou), JOHN JAMES, an American naturalist of French extraction, born near New Orleans in 1780, was educated in France, and studied painting under David. In 1798 he settled in Pennsylvania, but having a great love for ornithology he set out in 1810 with his wife and child, descended the Ohio, and for many years roamed the forests in every direction, drawing the birds which he shot. In 1826 he went to England, exhibited his drawings in Liverpool, Manchester, and Edinburgh, and finally published them in a work of double-folio size, with hundreds of colored plates of birds the size of life (*The Birds of America*, 4 vols., 1827-39), with an accompanying text (*Ornithological Biography*, 5 vols. 8vo, partly written by Prof. Macgillivray). On his final return to America he labored with Dr. Bachman on a finely illustrated work entitled *The Quadrapeds of America* (1843-50, 3 vols.). He died at New York in 1851.

Auerbach (ou'ér-bâh), a manufacturing town of Germany, kingdom of Saxony, 18 miles s. of Zwickau. Pop. 9574.

Auerbach, BERTHOLD, a distinguished German author of Jewish extraction, born 1812, died 1882. He abandoned the study of Jewish theology in favor of philosophy, publishing in 1836 his *Judaism and Modern Literature*, and a translation of the works of Spinoza with critical biography (5 vols., 1841). His later works were tales or novels, and his *Village Tales of the Black Forest* (*Schwarzwälder Dorfgeschichten*) as well as others of his writings have been translated into several languages. Other works: *Barfüsseler*; *Joseph im Schnee*; *Edelweiss*; *Auf der Höhe*; *Das Landhaus am Rhein*; *Waldfried*; *Brigitta*.

Auerstadt (ou'ér-stet), battle at, Oct. 14, 1806. See *Jena*.

Augeas (a-jé'as), a fabulous king of Elis, in Greece, whose stable contained 3000 oxen, and had not been cleaned for thirty years. Hercules undertook to clear away the filth in one day in return for a tenth part of the cattle, and executed the task by turning the river Alpheus through it. Augeas, having broken the bargain, was deposed and slain by Hercules.

Auger (a'gér), an instrument for boring holes considerably larger than those bored by a gimlet; used by carpenters and joiners, shipwrights, etc.

Augereau (ôzh-rô), PIERRE FRANÇOIS CHARLES, Duke of Castiglione, Marshal of France, son of a

mason, born at Paris in 1757. He adopted the life of a soldier, and by 1796 had reached the rank of general of division in the army of Italy. At Casale, Lodi, Castiglione, and Arcole, he highly distinguished himself. In 1797 he was at Paris, and was the instrument of the coup d'état of the 18th Fructidor (Sept. 4). In 1799 he was chosen a member of the Council of Five Hundred. He then obtained the command of the army in Holland, and fought till the end of the campaign. In 1803 he was appointed to lead the army collected at Bayonne against Portugal. In 1804 he was named marshal of the empire, and grand officer of the Legion of Honor. He subsequently took part in the battles of Jena and Eylau, held a command in Spain, and in July, 1813, led the army in Bavaria against Saxony, taking part in the battle of Leipzig. On Napoleon's abdication he submitted to Louis XVIII, who named him a peer. He died in 1816.

Augier (c-zhî-â), EMILE, a noted French dramatist, born 1822, came young to Paris, entered a lawyer's office, but relinquished law for literature; elected an academicien in 1857; in 1868 a commander of the Legion of Honor. His first and one of his best dramas was the comedy *La Cigale* (1844); among his other works are *L'Aventurière*, *Gabrielle*, *Paul Forestier*, *Le Mariage d'Olympe*, *Le Gendre de M. Poirier*, *Les Effrontés*, *Le Fils de Giboyer*, *Les Lions et les Renards*, *Maitre Guérin*, *Les Fourchambault*, etc. Died in 1889.

Augite (a'jit), or PYROXENE, a mineral of the hornblende family, an essential component of many igneous rocks, such as basalt, greenstone, and porphyry. When crystallized it assumes the form of short, slightly rhombic prisms with their lateral edges replaced, and terminated at one or both extremities by numerous planes. Its specific gravity is from 3.19 to 3.52; luster vitreous; hardness sufficient to scratch glass. It has many varieties, diopside, sahlite, malacolite, coccolite, etc., but is composed essentially of silica, lime, and magnesia. It may be imitated by the artificial fusion of its constituents. A transparent green variety found at Zillerthal, in the Tyrol, is used in jewelry.

Augsburg (ougz'burh; Lat. *Augusta Vindelicorum*), a city of Bavaria, at the junction of the Wertach and Lech, antique in appearance, but some fine streets, squares, and handsome or interesting buildings, including a splendid town-hall, a lofty belfry (Perlach Tower), cathedral, with paintings by Domenichino, Holbein, etc.; St.

Ulrich's Church; the bishop's palace, where the Augsburg Confession was presented to the diet, now a royal residence; the Fugger Palace, or mansion of the celebrated Fugger family, the public library, the theater, the Academy of Arts, and the Fugger range of almshouses. Augsburg was a renowned commercial center in the middle ages, and is still an important emporium of South German and Italian trade; industries: cotton spinning and weaving, dyeing, woolen manufacture, machinery and metal goods, books and printing, chemicals, etc. The Emperor Augustus established a colony here about 12 B.C. In 1276 it became a free city, and besides being a great mart for the commerce between the north and south of Europe, it was a great center of German art in the middle ages. It early took a conspicuous part in the Reformation. (See next article.) In 1806 it was incorporated in Bavaria. Pop. 1910, 102,293.

Augsburg Confession, a document presented by the Protestants at the Diet of Augsburg, 1530, to the Emperor Charles V and the diet, and being signed by the Protestant States was adopted as their creed. Luther made the original draught; but as its style appeared too violent it was given to Melancthon for amendment. The original is to be found in the Imperial Austrian archives. Afterwards Melancthon arbitrarily altered some of the articles, and there arose a division between those who held the original and those who held the altered Augsburg Confession. Acceptance of the Confession was a condition of membership in the Schmalkalden League.

Augurs (a-gurs), a board or college of diviners who, among the Romans, predicted future events and announced the will of the gods from the occurrence of certain signs. These consisted of signs in the sky, especially thunder and lightning; signs from the flight and cries of birds; from the feeding of the sacred chickens; from the course taken or sounds uttered by various quadrupeds or by serpents; from accidents or occurrences, such as spilling the salt, sneezing, etc. The answers of the augurs as well as the signs by which they were governed were called *auguria*, but bird-predictions were properly termed *auspices*. Nothing of consequence could be undertaken without consulting the augurs, and by the mere utterance of the words *alio die* ("meet on another day") they could dissolve the assembly of the people and annul all decrees passed at the meeting.

August (a-gust), the eighth month of the year. It was the sixth of the Roman year, and hence was called *Sextilis*, till the Emperor Augustus affixed to it his own name, from the fact that Julius Caesar had given his name to the preceding month. He also changed its length to 31 days from the same jealous motive, and thus disturbed the regular succession of the months in the Julian calendar.

Augusta (a-gus'ta), the name of many ancient places, as Augusta Trevirorum, now *Treves*; Augusta Taurinorum, now *Turin*; Augusta Vindelicorum, now *Augsburg*, etc.

Augusta (ou-gus'ta), or AGOS'TA, a seaport in the southeast of Sicily, 12 miles north of Syracuse. It exports salt, honey, etc. Pop. 15,817.

Augusta (a-gus'ta), the capital of Maine, on the river Kennebec, 44 miles from its mouth, at the head of navigation. It is on the Maine Central railroad and is connected with Boston by steamship line. A large dam furnishes power for cotton, pulp and paper mills. The city is one trade center of a large farming community. Pop. 13,211.

Augusta, a city of Georgia, the capital of Richmond county, on the Savannah river, 231 miles from its mouth, in a rich agricultural country. It is an important cotton center and a manufacturing city of importance, with a power canal furnishing electric and water power for cotton mills and other industries. Augusta is also a famous health resort and contains the winter home of many northerners. Pop. 41,040.

Augustine (a-gus'ten; AURELIUS AUGUSTINUS), ST., a renowned father of the Christian Church, was born at Tagaste, in Africa, in 354, his mother, Monica, being a Christian, his father, Patricius, a Pagan. His parents sent him to Carthage to complete his education, but he disappointed their expectations by his neglect of serious study and his devotion to pleasure. A lost book of Cicero's, called *Hortensius*, led him to the study of philosophy; but dissatisfied with this he went over to the Manichaeans. He was one of their disciples for nine years, but left them, went to Rome, and thence to Milan, where he announced himself as a teacher of rhetoric. St. Ambrose, the bishop of this city, converted him to the faith of his boyhood, and the reading of Paul's epistles wrought an entire change in his life and character. He retired into solitude, and prepared himself for baptism, which he received in his thirty-third year from the hands of Ambrose. Returning to Africa, he sold his estate and gave

the proceeds to the poor, retaining only enough to support him. At the desire of the people of Hippo Augustine became the assistant of the bishop of that town, preached with extraordinary success, and in 395 succeeded to the see. He entered into a warm controversy with Pelagius concerning the doctrines of free will, grace, and predestination, and wrote treatises concerning them, but of his various works his *Confessions* is most secure of immortality. He died August 28, 430, while Hippo was besieged by the Vandals. He was a man of great enthusiasm, self-devotion, zeal for truth, and powerful intellect, and though there have been fathers of the church more learned, none have wielded a more powerful influence. His writings are partly autobiographical (as the *Confessions*), partly polemical, homiletic, or exegetical. The greatest is the *City of God* (*De Civitate Dei*), a vindication of Christianity.

Augustine, or **AUSTIN, ST.**, the *Apostle of the English*, flourished at the close of the sixth century, was sent with forty monks by Pope Gregory I to introduce Christianity into Saxon England, and was kindly received by Ethelbert, King of Kent, whom he converted, baptizing 10,000 of his subjects in one day. In acknowledgment of his tact and success Augustine received the archiepiscopal pall from the pope, with instructions to establish twelve sees in his province, but he could not persuade the British bishops in Wales to unite with the new English Church. He died in 604, or some years later.

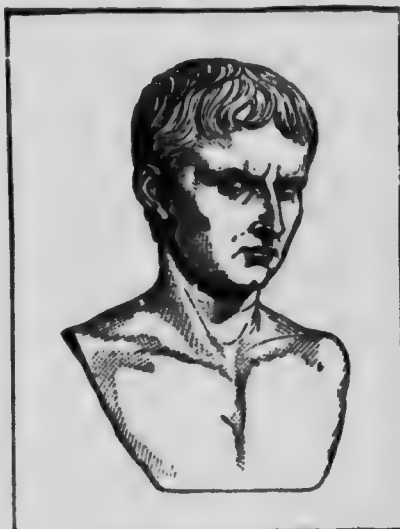
Augustines (a-gus-tins), or **AUGUSTINES**, members of several monastic fraternities who follow rules framed by the great St. Augustine, or deduced from his writings, of which the chief are the Canons Regular of St. Augustine, or Austin Canons, and the Begging Hermits or Austin Friars. The Austin Canons were introduced into Britain about 1100, and had about 170 houses in England and about 25 in Scotland. They took the vows of chastity and poverty, and their habit was a long black cassock with a white rochet over it, having over that a black cloak and hood. The Austin Friars, originally hermits, were a much more austere body, went barefooted, and formed one of the four orders of mendicants. An order of nuns had also the name of Augustines. Their garments, at first black, were latterly violet.

Augustowo (ow-gös-to'vo), a town of Russian Poland, government Suwalki. Pop. 13,000.

Augustulus (a-gus'tu-lus), **ROMULUS**, the last of the Western

Roman Emperors; reigned for one year (475-76), when he was overthrown by Odoacer and banished.

Augustus (a-gus'tus), **CAIUS JULIUS CAESAR OCTAVIANUS**, originally called *Caius Octavius*, Roman Emperor, was the son of Caius Octavius and Atia, a daughter of Julia, the sister of Julius Caesar. He was born 63 B.C., and died A.D. 14. Octavius was at Apollonia, in Epirus, when he received news of the death of his uncle (B.C. 44), who had previously adopted him as his son. He returned to Rome to claim Caesar's property and avenge his death, and now took, according to usage, his uncle's name with the surname Octavianus. He was aiming secretly at the chief power, but at first



The Emperor Augustus.

he joined the republican party, and assisted at the defeat of Antony at Mutina. He got himself chosen consul in 43. Soon after the first triumvirate was formed between him and Antony and Lepidus, and this was followed by the conscription and assassination of three hundred senators and two thousand knights of the party opposed to the triumvirate. Next year Octavianus and Antony defeated the republican army under Brutus and Cassius at Philippi. The victors now divided the Roman world between them, Octavianus getting the West, Antony the East, and Lepidus Africa. Sextus Pompeius, who had made himself formidable at sea, had now to be put down; and Lepidus, who had hitherto retained an appearance of power, was deprived of all authority (B.C. 36) and retired into private life. Antony and Octavianus now

shared the empire between them; but while the former, in the East, gave himself up to a life of luxury, and alienated the Romans by his alliance with Cleopatra and his adoption of Oriental manners, Octavianus skillfully cultivated popularity, and soon declared war ostensibly against the Queen of Egypt. The naval victory of Actium, in which the fleet of Antony and Cleopatra was defeated, made Octavianus master of the world, B.C. 31. He returned to Rome B.C. 29, celebrated a splendid triumph, and caused the temple of Janus to be closed in token of peace being restored. Gradually all the highest offices of State, civil and religious, were united in his hands, and the new title of Augustus was also assumed by him, being formally conferred by the senate in B.C. 27. Great as was the power given to him, he exercised it with wise moderation, and kept up the show of a republican form of government. Under him successful wars were carried on in Africa and Asia (against the Parthians), in Gaul and Spain, in Pannonia, Dalmatia, etc.; but the defeat of Varus by the Germans under Arminius with the loss of three legions, A.D. 9, was a great blow to him in his old age. Many useful decrees proceeded from him, and various abuses were abolished. He gave a new form to the senate, employed himself in improving the morals of the people, enacted laws for the suppression of luxury, introduced discipline into the armies, and order into the games of the circus. He adorned Rome in such a manner that it was said, 'He found it of brick, and left it of marble.' The people erected altars to him, and, by a decree of the senate, the month Sextilis was called *Augustus* (our August). He gave it 31 days, in order that July, the month of Julius Cæsar, should not surpass it in length. Through this piece of vanity the preceding regular succession in length of the months was broken up. He was a patron of literature; Virgil and Horace were befriended by him, and their works and those of their contemporaries are the glory of the *Augustan Age*. His death, which took place at Nola, plunged the empire into the greatest grief. He was thrice married, but had no son, and was succeeded by his stepson Tiberius, whose mother Livia he had married after prevailing on her husband to divorce her.

Augustus II (or FREDERICK AUGUSTUS I), Elector of Saxony and King of Poland, second son of John George III, elector of Saxony, was born at Dresden in 1670, died at Warsaw in 1733. He succeeded his brother in the

electorate in 1694, and the Polish throne having become vacant, in 1696, by the death of John Sobieski, Augustus presented himself as a candidate for it and was successful. He joined with Peter the Great in the war against Charles XII of Sweden, invaded Livonia, but was defeated by Charles near Riga, and at Clissow, between Warsaw and Cracow. In 1704 he was deposed, and two years later formally resigned the crown to Stanislaus I, now devoting himself to his Saxon dominions. In 1709, after the defeat of Charles at Pultowa, the Poles recalled Augustus, who united himself anew with Peter. The two monarchs, in alliance with Denmark, sent troops into Pomerania, but the Swedish general Stenbock defeated the allies at Gadebusch, Dec. 20, 1712. The death of Charles XII put an end to the war, and Augustus concluded a peace with Sweden. A confederation was now formed in Poland against the Saxon troops, but through the mediation of Peter an arrangement was concluded by which the Saxon troops were removed from the kingdom. Augustus now gave himself wholly up to voluptuousness and a life of pleasure. His court was one of the most splendid and polished in Europe. The Poles yielded but too readily to the example of their king, and the last years of his reign were characterized by boundless luxury and corruption of manners. His wife left him one son. The Countess of Königsmark bore him the celebrated commander Marshal Saxe (Maurice of Saxony).

Augustus III (or FREDERICK AUGUSTUS II), Elector of Saxony and King of Poland, son of Augustus II, born at Dresden in 1696, succeeded his father as elector in 1733, and was chosen King of Poland through the influence of Austria and Russia. He closely followed the example of his father, distinguishing himself by the splendor of his feasts and the extravagance of his court. He preferred Dresden to Warsaw, and through his long absence from Poland the government sank into entire inactivity. During the first Silesian war he formed a secret alliance with Austria. The consequence was that during the second Silesian war Frederick the Great of Prussia pushed on into Saxony, and occupied the capital, from which Augustus fled. By the peace of Dresden, Dec. 25, 1745, he was reinstated in the possession of Saxony. In 1756 he was involved anew in war against Prussia. When Frederick declined his proposal of neutrality he left Dresden, and entered the camp at Pirna, where 17,000 Saxons

troops were assembled. Frederick surrounded the Saxons, who were obliged to surrender, and Augustus fled to Poland. On the threat of invasion by Russia he returned to Dresden, where he died in 1763. His son, Frederick Christian, succeeded him as Elector of Saxony, and Stanislaus Poniatowski as King of Poland.

Auk (*awk*), a name of certain swimming birds, family *Alcidae*, including the great auk, the little auk, the puffin, etc. The genus *Alca*, or auks proper, contains only two species, the great auk (*Alca impennis*) and the razor bill (*Alca torda*). The great auk or gauzowl, a bird about 3 feet in length, used to be plentiful in northerly regions, and also visited the British shores, but has become extinct. Some seventy skins, about as many eggs, with bones representing perhaps a hundred individuals, are preserved in various museums. Though the largest species of the family, the wings were only 6 inches from the carpal joint to the tip, totally useless for flight, but employed as fins in swimming, especially under water. The tail was about 3 inches long; the beak was high, short, and compressed; the head, neck, and upper parts were blackish; a large spot under each eye, and most of the under parts white. Its legs were placed so far back as to cause it to sit nearly upright. The razorbill is about 15 inches in length, and its wings are sufficiently developed to be used for flight. Thousands of these birds are killed on the coast of Labrador for their breast feathers, which are warm and elastic.

Aulapolay (*a-lap'o-la*), or **ALLEPPI**, a seaport on the southwest coast of Hindustan, Travancore, between the sea and a lagoon, with a safe roadstead all the year round; exports timber, coir, cocoanuts, etc. Pop. 24,918.

Aulic (*a'lik*; Lat. *aula*, a court or hall), an epithet given to a council (the *Reichshofrath*) in the old German Empire, one of the two supreme courts of the German Empire, the other being the court of the imperial chamber (*Reichskammergericht*). It had not only concurrent jurisdiction with the latter court, but in many cases exclusive jurisdiction, in all feudal processes, and in criminal affairs, over the immediate feudatories of the emperor and in affairs which concerned the imperial government. The title is now applied in Germany in a general sense to the chief council of any department, political, administrative, judicial, or military.

Aulis (*a'lis*), in ancient Greece, a seaport in Boeotia, on the strait called Eu-

ripus, between Boeotia and Euboea. See *Iphigenia*.

Aullagas (*ou-lyä'gäs*), a salt lake of Bolivia, which receives the surplus waters of Lake Titicaca through the Rio Desagualero, and has only one perceptible insignificant outlet, so that what becomes of its superfluous water is still a matter of uncertainty.

Aumale (*ö-mäl*), a small French town, department of Seine Inférieure, 35 miles N. E. of Rouen, which has given titles to several notables in French history.—**JEAN D'ARCOURT**, EIGHTH COUNT D'AUMALE, fought at Agincourt, and defeated the English at Gravelle (1423).—**CLAUDE II, DUC D'AUMALE**, one of the chief instigators of the Massacre of St. Bartholomew, was killed 1573.—**CHARLES DE LORRAINE, DUC D'AUMALE**, was an ardent partisan of the League in the politico-religious French wars of the sixteenth century.—**HENRI-EUGENE-PHILIPPE LOUIS D'ORLEANS, DUC D'AUMALE**, son of Louis Philippe, king of the French, was born in 1822. In 1847 he succeeded Marshal Bugeaud as governor-general of Algeria, where he had distinguished himself in the war against Abd-el-Kader. After the revolution of 1848 he retired to England; but he returned to France in 1871, and was elected a member of the assembly; became inspector-general of the army in 1879, and was expelled along with the other royal princes in 1886. He is author of a *History of the House of Condé*, several pamphlets, etc. Died 1897.

Aungerville (*an'ger-vil*), **RICHARD**, known as Richard de Bury (from his birthplace Bury St. Edmund's), English statesman, bibliographer, and correspondent of Petrarch, born 1281, died 1345. He entered the order of Benedictine monks, and became tutor to the Prince of Wales, afterwards Edward III. Promoted to several offices of dignity, he ultimately became Bishop of Durham, and Lord-chancellor of England. During his frequent embassies to the continent he made the acquaintance of many of the eminent men of the day. He was a diligent collector of books, and formed a library at Oxford. Author of *Philobiblon*, 1473; *Epistola Familiarium*, including letters to Petrarch, etc.

Aunoy (*ö-nwä*), **COUNTESS D'**, French writer, born 1650, died 1705, was the author of *Contes des Fées* (Fairy Tales), many of which, such as *The White Cat*, *The Yellow Dwarf*, etc., have been translated into English. She also wrote a number of novels, historical memoirs, etc.

Aurangabad (*a-rang-gä-bäd'*), or **Aurangabad**, a town of

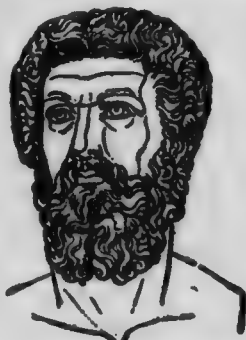
India, in the territory of the Nizam of Haidarabad, 175 miles from Bombay. It contains a ruined palace of Aurengzebe and a mausoleum erected to the memory of his favorite wife. It was formerly a considerable trading center, but its commercial importance decreased when Haidarabad became the capital of the Nizam. Pop. 28,165.

Aurantiaceae (a-ran-ti-a'se-è), the orange tribe, a natural order of plants, polypetalous dicotyledons, with leaves containing a fragrant essential oil in transparent dots, and a superior pulpy fruit, originally natives of India; examples comprise the orange, lemon, lime, citron, and shaddock.

Auray (ô-râ), a seaport of northwest France, dep. Morbihan, with a deaf and dumb institute, and within 2 miles of St. Anne of Auray, a famous place of pilgrimage. Pop. (1906) 5241.

Aurelian (a-rè'li-an), **LUCIUS DOMITIUS AURELIANUS**, Emperor of Rome, of humble origin, was born about 212 A.D., rose to the highest rank in the army, and on the death of Claudius II (270) was chosen emperor. He delivered Italy from the barbarians (Alemanni and Marcomanni), and conquered the famous Zenobia, Queen of Palmyra. He followed up his victories by the reformation of abuses, and the restoration throughout the empire of order and regularity. He lost his life, A.D. 275, by assassination, when heading an expedition against the Persians.

Aurelius Antoninus (a-rè'li-us an-to-ni'us), **MARCUS**, often called simply **MARCUS**



Marcus Aurelius

AURELIUS, Roman emperor and philosopher, son-in-law, adopted son, and successor of Antoninus Pius, born A.D. 121, succeeded to the throne 161, died 180. His name originally was **Marcus Annius Verus**. He voluntarily shared the government with **Lucius Verus**, whom Antoninus Pius had also adopted. Brought up and instructed by Plutarch's nephew, **Sextus**, the orator **Herodes Atticus**, and **L. Volusius Mecianus**, the jurist, he had become acquainted with learned men, and formed a particular love for the Stoic philosophy. A war with Parthia broke out in the year of his accession, and did

not terminate till 166. A confederacy of the northern tribes now threatened Italy, while a frightful pestilence, brought from the East with the army, raged in Rome itself. Both emperors set out in person against the rebellious tribes. In 169 **Verus** died, and the sole command of the war devolved on **Marcus Aurelius**, who prosecuted it with the utmost rigor, and nearly exterminated the **Marcomanni**. His victory over the **Quadi** (174) is connected with a famous legend. **Dion Cassius** tells us that the twelfth legion of the Roman army was shut up in a defile, and reduced to great straits for want of water, when a body of Christians enrolled in the legion prayed for relief. Not only was rain sent, which enabled the Romans to quench their thirst, but a fierce storm of hail beat upon the enemy, accompanied by thunder and lightning, which so terrified them that a complete victory was obtained, and the legion was ever after called 'The Thundering Legion.' After this victory the **Marcomanni**, the **Quadi**, as well as the rest of the barbarians, sued for peace. The sedition of the Syrian governor **Avidius Cassius**, with whom **Faustina**, the empress, was in treasonable communication, called off the emperor from his conquests, but before he reached Asia the rebel was assassinated. **Aurelius** returned to Rome, after visiting Egypt and Greece, but soon new incursions of the **Marcomanni** compelled him once more to take the field. He defeated the enemy several times, but was taken sick at **Sirmium**, and died at **Vindobona** (**Vienna**) in 180. His only extant work is the *Meditations*, written in Greek, and which has been translated into most modern languages. This may be regarded as a manual of practical morality, in which wisdom, gentleness, and benevolence are combined in the most fascinating manner. Many believe it to have been intended for the instruction of his son **Commodus**. **Aurelius** was one of the best emperors ever Rome saw, although his philosophy and the magnanimity of his character did not restrain him from the persecution of the Christians, whose religious doctrines he was led to believe were subversive of good government.

Aurelius Victor, **SEXTUS**, a Roman historian, who lived between 350 and 400. He wrote *De Caesaribus Historia*, an extant work, and is the reputed author of *Lives of Illustrious Romans*, and *On the Life and Character of the Emperors*, both extant.

Aurengzebe (a'reng-zèb; 'ornament of the throne'), one of the greatest of the Mogul emperors of Hindustan, born in 1618 or 1619. When

he was nine years old his weak and unfortunate father, Shah Jehan, succeeded to the throne. Aurengzebe was distinguished, when a youth, for his serious look, his frequent prayers, his love of solitude, his profound hypocrisy, and his deep plans. In his twentieth year he raised a body of troops by his address and good fortune, and obtained the government of the Deccan. He stirred up dissensions between his brothers, made use of the assistance of one against the other, and finally shut his father up in his harem, where he kept him prisoner. He then murdered his relatives one after the other, and in 1659 ascended the throne. Notwithstanding the means by which he had got possession of power, he governed with much wisdom. Two of his sons, who endeavored to form a party in their own favor, he caused to be arrested and put to death by slow poison. He carried on many wars, conquered Golconda and Bijapur, and was engaged in ceaseless conflicts with the Mahratta power. After his death the Mogul Empire declined.

Aureola, Aureole (a-rē'ō-la, a-rē'ōl), in paintings, an illumination surrounding a holy person, as Christ, a saint, or a martyr, intended to represent a luminous cloud or haze emanating from him. It is generally of an oval shape, or may be nearly or quite circular, and is of similar character with the nimbus surrounding the heads of sacred personages.

Aureus (a-re-us). 1. Roman gold coin, first struck under Sulla, 1st century B.C. Its value varied at different times, from about \$3 to \$6. 2. *Staphylococcus pyogenes aureus*, a virulent pus-producing micro-organism, generating a golden color.

Aurich (ou'rēh), a German town, province of Hanover. Pop. 6013.

Auricle (a'ri-kl). See *Heart*.

Auricula (a-rik'u-la), a garden flower derived from the yellow *Primula Auricula*, found native in the Swiss Alps, and sometimes called bear's ear from the shape of its leaves. It has for centuries been an object of cultivation by florists, who have succeeded in raising from seed a great number of beautiful varieties. Its leaves are obovate, entire or serrated, and fleshy, varying, however, in form in the numerous varieties. The flowers are borne on an erect umbel and central scape with involucre. The original colors of the corolla are yellow, purple, and variegated, and there is a mealy covering on the surface.

Auricular Confession. See *Confession*.

Aurifaber (ow'ri-fā-bir), the Latinized name of Johann Goldschmidt, one of Luther's companions, born in 1519, became pastor at Erfurt in 1566; died there in 1579. He collected the unpublished MSS. of Luther, and edited the *Letters* and the *Table-talk*.

Auriflamme (a'ri-flam). See *Oriflamme*.

Auriga (a-rē'ga), in astronomy, the *Wagoner*, a constellation of the northern hemisphere, containing the magnificent yellow star Capella, one of the brightest in the northern heavens.

Aurillac (ō-rē-yāk), a town of France, capital of the dep. Cantal, in a valley watered by the Jordanne, about 270 miles S. of Paris; contains several ancient buildings of note; copper works, paper works, manufactures of lace, tapestry, leather, etc. Pop. (1906) 14,097.

Aurochs (a'roks), a species of wild bull or buffalo, the *urus* of Cæsar, *bison* of Pliny, the European bison, *Bos* or *Bonassus Bison* of modern naturalists. This animal was once abundant in Europe, but were it not for the protection afforded by the Emperor of Russia to a few herds which inhabit a Lithuanian forest it would soon be totally extinct.

Aurora (a-ro'ra), a city of Kane Co., Illinois, 39 miles W. S. W. of Chicago. It is an important commercial center, has large foundries and machine shops, manufactures of machinery, cotton mills, etc. Pop. 33,000.

Aurora (a-ro'ra), a city of Lawrence County, Missouri, 31 miles S. W. of Springfield; in midst of rich farming and fruit country, and has lead and zinc mines. Pop. 5204.

Aurora (Gr. *Ēōs*) in classical mythology, the goddess of the dawn, daughter of Hyperion and Theia, and sister of Helios and Selēnē (Sun and Moon). She was represented as a charming figure, 'rosy-fingered,' clad in a yellow robe, rising at dawn from the ocean and driving her chariot through the heavens. Poets mention her love of Orion, Tithonus, and Cephalus.

Auro'ra, one of the New Hebrides islands, S. Pacific Ocean, about 30 miles long by 5 wide. It rises to a considerable elevation, and is covered with a luxuriant vegetation.

Auro'ra Borea'lis, a luminous meteoric phenomenon appearing in the north, most frequently in high latitudes, the corresponding phenomenon in the southern hemisphere being called *Aurora Australis*, and both being also called *Polar Light*, *Streamers*, etc. The northern aurora has been by far the most observed and studied. It usually

manifests itself by streams of light ascending towards the zenith from a dusky line of cloud or haze a few degrees above the horizon, and stretching from the north towards the west and east, so as to form an arc with its ends on the horizon, and its different parts and rays are constantly in motion. Sometimes it appears in detached places; at other times it covers almost the whole sky. It assumes many shapes and a variety of colors, from a pale red or yellow to a deep red or blood color; and in the northern latitudes serves to illuminate the earth and cheer the gloom of the long winter nights. The appearance of the aurora borealis so exactly resembles the effects of artificial electricity that there is every reason to believe that their causes are identical. When electricity passes through rarefied air it exhibits a diffused luminous stream which has all the characteristic appearances of the aurora, and hence it is highly probable that this natural phenomenon is occasioned by the passage of electricity through the upper regions of the atmosphere. The influence of the aurora upon the magnetic needle is now considered as an ascertained fact, and the connection between it and magnetism is further evident from the fact that the beams or coruscations issuing from a point in the horizon west of north are frequently observed to run in the magnetic meridian. What are known as magnetic storms are invariably connected with exhibitions of the aurora, and with spontaneous galvanic currents in the ordinary telegraph wires; and this connection is found to be so certain that, upon remarking the display of one of the three classes of phenomena, we can at once assert that the other two are also observable. The aurora borealis is said to be frequently accompanied by sound, which is variously described as resembling the rustling of pieces of silk against each other, or the sound of wind against the flame of a candle. The aurora of the southern hemisphere is quite a similar phenomenon to that of the north.

Aurangabad.

See *Aurangabad*.

Aurangzebe.

See *Aurengzebe*.

Auscultation

(as-kul-ta'shun), a method of distinguishing

the state of the internal parts of the body, particularly of the thorax and abdomen, by observing the sounds arising in the part either through the immediate application of the ear to its surface (immediate auscultation) or by applying the stethoscope to the part and listening through it (mediate auscultation). Aus-

cultation may be used with more or less advantage in all cases where morbid sounds are produced, but its general applications are: the *auscultation* of respiration, the *auscultation* of the voice: *auscultation* of coughs; *auscultation* of sounds foreign to all these, but sometimes accompanying them; *auscultation* of the actions of the heart; obstetric *auscultation*. The parts when struck also give different sounds in health and disease.

Ausonia (a-sū'ni-a), an ancient poetical name of Italy.

Ausonius

(a-sū'ni-us), DECIVS MAGNUS, Roman poet, born at

Burdigala (Bordeaux) about 310 A.D., died about 392. Valentinian intrusted to him the education of his son Gratian, and appointed him afterwards quaestor and praetorian prefect. Gratian appointed him consul in Gaul, and after this emperor's death he lived upon an estate at Bordeaux, devoted to literary pursuits. He wrote epigrams, idyls, eclogues, letters in verse, etc., still extant, and was probably a Christian. His poems have no great merit.

Auspices

(as'pi-ses), among the ancient Romans strictly omens

or auguries derived from birds, though the term was also used in a wider sense. Nothing of importance was done without taking the auspices, which, however, simply showed whether the enterprise was likely to result successfully or not, without supplying any further information. Magistrates possessed the right of taking the auspices, in which they were usually assisted by an augur. Before a war or campaign a Roman general always took the auspices, and hence the operations were said to be carried out 'under his auspices.' See *Augur*.

Aussig

(ow'sig), a town in Bohemia, near the junction of the Biela

with the Elbe, 42 miles N. N. W. of Prague; has mines and ships much coal; also has large manufactures of woollens, chemicals, etc. Pop. 37,265.

Austen

(as'ten), JANE, English novelist, born 1775, at Steventon.

in Hants, of which parish her father was rector. Her principal novels are, *Seneca and Sensibility*; *Pride and Prejudice*; *Mansfield Park*; and *Emma*. Two more were published after her death entitled *Northanger Abbey* and *Persuasion*, the former written in 1798, the latter in 1813. Her novels are marked by ease, nature, and a complete knowledge of the domestic life of the English middle classes of her time, and still retain their popularity. She died in 1817.

Austerlitz (as'tér-litz), a town of Moravia, 10 miles E. of Brünn,

Austín

famous for the battle of the 2d of December, 1805, fought between the French (70,000 in number) and the allied Austrian and Russian armies (95,000). The decisive victory of the French led to the Peace of Pressburg, between France and Austria.

Austin (as'tin), capital of the State of Texas, on the Colorado, about 200 miles from its mouth, and served by three trunk railroads. There are a State University and other institutions, and a capitol, built of red granite. A large dam across the Colorado supplies abundant power, and there are various manufactories, canneries, cotton compresses, etc. Pop. (1910) 29,860.

Austin, a city, capital of Mower Co., Minnesota, 101 miles s. from St. Paul. Has a large meat-packing plant, brick and tile works, cement works, etc. Pop. 8000.

Austin, ALFRED, poet-laureate of England, in succession to Tennyson, was born at Leeds in 1835; studied at Stonyhurst Jesuit College and the London University. He was admitted to the bar in 1857, but since 1860 has devoted himself chiefly to travel and literature. He has published several volumes of poems, and in 1903, a tragedy called *Flodden Field*. He died June 2, 1913.

Austin, JOHN, an English writer on jurisprudence, born 1790, died 1859. From 1826 to 1832 he filled the chair of jurisprudence at London University. He served on several royal commissions, one of which took him to Malta; lived for some years on the continent, and finally settled at Weybridge in Surrey. His fame rests solely on his great works, *The Province of Jurisprudence Determined*, published in 1832; and his *Lectures on Jurisprudence*, published by his widow between 1861 and 1863.

Australasia (as-tral-á'sha), a division of the globe usually regarded as comprehending the islands of Australia, Tasmania, New Zealand, New Caledonia, the New Hebrides, the Solomon Islands, New Ireland, New Britain, the Admiralty Islands, New Guinea, and the Arru Islands, besides numerous other islands and island groups. It forms one of three portions into which some geographers have divided Oceania, the other two being Malasia and Polynesia.

Australia (as-trá'li-a; older name, NEW HOLLAND), the largest island in the world, of such extent that it is classed as a continent, lying between the Indian and Pacific Oceans, s.e. of Asia; between lat. 10° 30' and 39° 11' s.; lon. 113° 5' and 153° 16' e.; greatest

Australia

length, from w. to e., 2400 miles; greatest breadth, from n. to s., 1700 to 1900 miles. It is separated from New Guinea on the north by Torres Strait, from Tasmania on the south by Bass Strait. It is divided into two unequal parts by the Tropic of Capricorn, and consequently belongs partly to the South Temperate, partly to the Torrid Zone. The Commonwealth of Australia is a part of the British Empire and is composed of six original states and two territories: New South Wales, Victoria, Queensland, South Australia, Western Australia, Tasmania, Northern Territory, and Federal Capital Territory. The area and population of the commonwealth are as follows:

	Area in sq. m.	Pop.
New South Wales.....	316,700	1,855,561
Victoria.....	87,884	1,421,985
Queensland.....	668,497	698,864
South Australia.....	380,070	439,680
Western Australia.....	975,920	323,952
Tasmania.....	28,215	196,768
Northern Territory.....	523,620	4,563
Federal Capital Territory.....	912	1,820
Commonwealth.....	2,973,818	4,943,172

Canberra, in the Federal Capital Territory, is the capital of the commonwealth. The largest cities are: Sydney, Melbourne, Adelaide, Brisbane and Perth.

Although there are numerous spacious harbors on the coasts, there are few remarkable indentations; the principal being the Gulf of Carpentaria, on the n., the Great Australian Bight, and Spencer Gulf, on the s. The chief projections are Cape York Peninsula and Arnhem Land in the north. Parallel to the n. e. coast runs the Great Barrier Reef for 1000 miles. In great part the r. coast is bold and rocky, and is fringed with many small islands. Part of the s. coast is low and sandy, and part presents cliffs several hundred feet high. The n. and w. coasts are generally low, with some elevations at intervals.

The interior, so far as explored, is largely composed of rocky tracts and barren plains with little or no water. The whole continent forms an immense plateau, highest in the east, low in the center, and with a narrow tract of land usually intervening between the elevated area and the sea. The base of the tableland is granite, which forms the surface-rock in a great part of the southwest, and is common in the higher grounds along the east side. Secondary (cretaceous) and tertiary rocks are largely developed in the interior. Silurian rocks occupy a large area in South Australia, on both sides of Spencer Gulf. The mountainous region in the southeast and east is mainly composed of volcanic, Silurian, carbonaceous, and carboniferous

rocks yielding good coal. No active volcano is known to exist, but in the southeast there are some craters only recently extinct. The highest and most extensive mountain system is a belt about 150 miles wide skirting the whole eastern and southeastern border of the continent, and often called in whole or in part the Great Dividing Range, from forming the great water-shed of Australia. A part of it, called the Australian Alps, in the southeast, contains the highest summits in Australia, Mount Kosciuszko (7328 feet), and Mount Townsend (7260) and lesser peaks. West of the Dividing Range are extensive plains or downs admirably adapted for pastoral purposes. The deserts and scrubs, which occupy large areas of the interior, are a characteristic feature of Australia. The former are destitute of vegetation, or are clothed only with a coarse spiny grass that affords no sustenance to cattle or horses; the latter are composed of a dense growth of shrubs and low trees, often impenetrable till the traveler has cleared a track with his axe.

The rivers of Australia are nearly all subject to great irregularities in volume, many of them at one time showing a channel in which there is merely a series of pools, while at another they inundate the whole adjacent country. The chief is the Murray, which, with its affluents, the Murrumbidgee, Lachlan, and Darling, drains a great part of the interior west of the Dividing Range, and falls into the sea in the south coast (after entering Lake Alexandria). Its greatest tributary is the Darling, which may even be regarded as the main stream. On the east coast are the Hunter, Clarence, Brisbane, Fitzroy, and Burdekin; on the west, the Swan, Murchison, Gascoyne, Ashburton, and De Grey; on the north, the Fitzroy, Victoria, Flinders, and Mitchell. The Australian rivers are of little service in facilitating internal communication. Many of them lose themselves in swamps or sandy wastes of the interior. A considerable river of the interior is Cooper Creek, or the Barcoo, which falls into Lake Eyre, one of a group of lakes on the south side of the continent having no outlet, and accordingly salt. The principal of these are Lakes Eyre, Torrens, and Gairdner, all of which vary in size and saltiness according to the season. Another large salt lake of little depth, Lake Amadeus, lies a little west of the center of Australia. Various others of less magnitude are scattered over the interior.

The climate of Australia is generally hot and dry, but very healthy. In the tropical portions there are heavy rains,

and in most of the coast districts there is a sufficiency of moisture, but in the interior the heat and drought are extreme. Considerable portions now devoted to pasturage are liable at times to suffer from drought. At Melbourne the mean temperature is about 56°, at Sydney about 63°. The southeastern settled districts are at times subject to excessively hot winds from the interior, which cause great discomfort, and are often followed by a violent cold wind from the south ('southerly bursters'). In the mountainous and more temperate parts snow-storms are common in winter (June, July, and August).

Australia is a region containing a vast quantity of mineral wealth. Foremost come its rich and extensive deposits of gold, first discovered in 1851. The principal mines were in Victoria, New South Wales, and Queensland till 1886, when W. Australia came into prominence with the opening of its first gold field, Kimberley, followed by a second, Yilgarn, in 1888, and the immensely rich Coolgardie in 1892.

It also possesses silver copper, tin, lead, zinc, antimony, mercury, plumbago, etc., in abundance, besides coal (now worked to a considerable extent in New South Wales) and iron. Various precious stones are found, as the garnet, ruby, topaz, sapphire, and even the diamond. Of building stone there are granite, limestone, marble, and sandstone.

The Australian flora presents peculiarities which mark it off by itself in a very decided manner. Many of its most striking features have an unmistakable relation to the general dryness of the climate. The trees and bushes have for the most part a scanty foliage, presenting little surface for evaporation, or thick leathery leaves well fitted to retain moisture. The most widely spread types of Australian vegetation are the various kinds of gum-tree (*Eucalyptus*), the she-oak (*Casuarina*), the acacia or wattle, the grass-tree (*Xanthorrhoea*), many varieties of Proteaceae, and a great number of ferns and tree-ferns. Of the gum-tree there are found upwards of 150 species, many of which are of great value. Individual specimens of the 'peppermint' (*E. amygdalina*) have been found to measure from 480 to 500 feet in height. As timber-trees the most valuable members of this genus are the *E. rostrata* (or red-gum), *E. leucorylon*, and *E. marginata*, the timber of which is hard, dense, and almost indestructible. A number of the gum-trees have deciduous bark. The wattle or acacia include about 300 species, some of them of con-

considerable economic value, yielding good timber or bark for tanning. The most beautiful and most useful is that known as the golden wattle (*A. pycnantha*), which in spring is adorned with rich masses of fragrant yellow blossoms. Palms—of which there are 24 species, all, except the cocoa-palm, peculiar to Australia—are confined to the north and east coasts. In the 'scrubs' already mentioned hosts of densely intertwined bushes occupy extensive areas. The *mallee* scrub is formed by a species of dwarf eucalyptus, the *mulga* scrub by a species of acacia (*A. aneura*). A plant covering large areas in the arid regions is the *spinifex* or porcupine grass, a hard, coarse and excessively spiny plant, which renders traveling difficult, wounds the feet of horses, and is utterly uneatable by any animal. Other large tracts are occupied by herbs or bushes of a more valuable kind, from their affording fodder. Foremost among those stands the salt-bush (*Atriplex nummularia*, order Chenopodiaceæ). Beautiful flowering plants are numerous. Australia also possesses great numbers of turf-forming grasses, such as the kangaroo-grass (*Anthistiria australis*), which survives even a tolerably protracted drought. The native fruit-trees are few and unimportant, and the same may be said of the plants yielding roots used as food; but exotic fruits and vegetables may now be had in the different colonies in great abundance and of excellent quality. The vine, the olive, and mulberry thrive well, and quantities of wine are now produced. The cereals of Europe and maize are extensively cultivated, and large tracts of country, particularly in Queensland, are under the sugar-cane.

The Australian fauna is almost unique in its character. Its great feature is the nearly total absence of all the forms of mammalia which abound in the rest of the world, their place being supplied by a great variety of marsupials—these animals being nowhere else found, except in the opossums of America. There are about 110 kinds of marsupials (of which the kangaroo, wombat, bandicoot, and phalangiers or opossums, are the best-known varieties), over twenty kinds of bats, a wild dog (the dingo), and a number of rats and mice. Two extraordinary animals, the platypus, or water-mole of the colonist (*Ornithorhynchus*), and the porcupine ant-eater (*Echidna*) constitute the lowest order of mammals (*Monotremata*), and are confined to Australia. Their young are produced from eggs. Australia now possesses a large stock of the domestic animals of Britain, which

thrive there remarkably well. The breed of horses is excellent. Horned cattle and sheep are largely bred, the first attaining a great size, while the sheep improve in fleece and their flesh in flavor. There are upwards of 650 different species of birds, the largest being the emu, or Australian ostrich, and a species of cassowary. Peculiar to the country are the black-swan, the honey-sucker, the lyre-bird, the brush-turkey, and other mound-building birds, the bower-birds, etc. The parrot tribe preponderates over most other groups of birds in the continent. There are many reptiles, the largest being the alligator, found in some of the northern rivers. There are upwards of 60 different species of snakes, some of which are very venomous. Lizards, frogs, and insects are also numerous in various parts. The seas, rivers, and lagoons abound in fish of numerous varieties, and other aquatic animals, many of them peculiar. Whales and seals frequent the coasts. On the N. coasts are extensive fisheries of trepang, much visited by native traders from the Indian Archipelago. Some animals of European origin, such as the rabbit and the sparrow, have developed into real pests in several of the colonies.

The natives belong to the Australian negro stock, and are sometimes considered the lowest as regards intelligence in the whole human family, though this is doubtful. They are of a dark-brown or black color, with jet-black curly but not woolly hair, of medium size, but inferior muscular development. In the settled parts of the continent they are inoffensive, and rapidly dying out. They have no fixed habitations; in the summer they live almost entirely in the open air, and in the more inclement weather they shelter themselves with bark erections of the rudest construction. They have no cultivation and no domestic animals. Their food consists of such animals as they can kill, and no kind of living creature seems to be rejected, snakes, lizards, frogs, and even insects being eaten, often half raw. They are ignorant of the potter's art. In their natural condition they wear little or no clothing. They speak a number of different languages or dialects. The women are regarded merely as slaves, and are frightfully maltreated. They have no religion; they practice polygamy, and are said to sometimes resort to cannibalism, but only in exceptional circumstances. They are occasionally employed by the settlers in light kinds of work, and as horse-breakers; but they dislike continuous occupation, and soon give it up. The weapons of all the tribes are gener-

ally similar, consisting of spears, shields, boomerangs, wooden axes, clubs and stone hatchets. Of these the boomerang is the most singular. In 1913 it was estimated that there were 80,000 full-blooded aboriginals in Australia.

Prior to the establishing of the commonwealth, there were six separate colonies on the island of Australia, each having a parliament of its own. In 1885 a measure was passed by the imperial parliament to enable the whole of the Australasian colonies to federate. This was accomplished by legislation from 1894 onward, the new commonwealth of Australia beginning its career January 1, 1901. The parliament of the commonwealth consists of a Senate of thirty-six members, six from each State, elected by the people, not by the State legislatures; and a Representative Chamber composed of members whose number is proportionate to the population, elected every three years by the people. There is a Governor-general appointed by the British sovereign, with powers somewhat more extensive than those of the U. S. President. There is no established church in any of the colonies. The denomination which numbers most adherents is the English or Anglican Church, next to which come the Roman Catholics, Presbyterians, and Methodists. Education is well provided for, instruction in the primary schools being in some cases free and compulsory, and the higher education being more and more attended to. There are flourishing universities in Melbourne, Sydney, and Adelaide. Newspapers are exceedingly numerous, and periodicals of all kinds are abundant. There is as yet no native literature of any distinctive type, but names of Australian writers of ability both in prose and poetry are beginning to be known beyond their own country.

Pastoral and agricultural pursuits and mining are the chief occupations of the Australians, though manufactures and handicrafts also employ large numbers. For sheep-rearing and the growth of wool Australia stands unrivaled, and while the production of gold since 1904 has steadily declined that of wool is constantly on the increase. The great bulk of the wool goes to Great Britain, whence Australia receives her chief supplies of manufactured goods in return for wool, gold, preserved meat, and other products. Next to wool come gold, tin, copper, wheat, meat, tallow, hides and skins, cotton, tobacco, sugar and wine as the most important items of export. The chief imports consist of textile fabrics, haberdashery and clothing, machinery and metal goods. There are upwards of 20,000 miles of

railway in operation, most of them government owned. The 1000-mile link from Kalgoorlie to Port Augusta in the great transcontinental system was completed in October, 1917, establishing through connection between Sydney, Melbourne, Adelaide and across the continent to Perth. The railroad is 3467 miles in length. There are numerous telegraph lines, some 46,000 miles of line being recorded for 1913. The first official wireless station was opened at Melbourne in 1912. The coinage is the same as in Great Britain. Banks and banking offices are numerous, including post-office or other savings banks for the reception of small sums. The opening of the Panama Canal (1914) provided a new route for Australian shipping destined for the Atlantic coast of the United States or Europe.

It is doubtful when Australia was first discovered by Europeans. Between 1531 and 1542 the Portuguese published the existence of a land which they called Great Java, and which corresponded to Australia, and probably the first discovery of the country was made by them early in the sixteenth century. The first authenticated discovery is said to have been made in 1601, by a Portuguese named Manoel Godinho de Eredia. In 1606 Torres, a Spaniard, passed through the strait that now bears his name, between New Guinea and Australia. Between this period and 1628 a large portion of the coast-line of Australia was surveyed by various Dutch navigators. In 1664 the continent was named New Holland by the Dutch government. In 1688 Dampier coasted along part of Australia, and about 1700 explored a part of the w. and n. w. coasts. In 1770 Cook carefully surveyed the E. coast, named a number of localities, and took possession of the country for Britain. He was followed by Bligh in 1780, who carried on a series of observations on the N. E. coast, adding largely to the knowledge already obtained of this new world. Colonists had now arrived on the soil, and a penal settlement was formed (1788) at Port Jackson. In this way was laid the foundation of the future colony of New South Wales. The Moreton Bay district (Queensland) was settled in 1825; in 1835 the Port Phillip district. In 1851 the latter district was erected into a separate colony under the name of Victoria. Previous to this time the colonies both of Western Australia and of South Australia had been founded—the former in 1829, the latter in 1836. Queensland was founded in 1859.

Australia stood solidly with the mother country in the European war (q. v.) and in addition to raising contingents for as-

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distance in Europe, took strong action in her own part of the world. Kaiser Wilhelm Land in German New Guinea was captured by the Australians in September, 1914; the Bismarck archipelago also fell into their hands; and the Carolines, which were taken by Japan, were turned over to Australia. The splendid deeds of the Australian and New Zealand Army Corps (the Anzacs) at the Dardanelles will long be remembered. (See *Gallipoli*.) Australia declined to adopt conscription (q. v.), but raised a splendid army of some 300,000 men by voluntary enlistment. In aeronautics (q. v.) Australia made a great record in 1919. Harry Hawker was the first to attempt a non-stop transatlantic flight, May 18. Capt. Ross Smith, another Australian, flew from England to Australia, Nov. 12-Dec. 10, winning the £10,000 prize.

Australian Ballot. See *Ballot*.

Austria (as'tri-a; in German, *Oesterreich*, that is, Eastern Empire), a country of central Europe, formerly part of Austria-Hungary (see following article), now a separate state, with an area of five thousand to six thousand square miles, and a population of between six and seven million. It is bounded by Switzerland and Lichtenstein on the west, Italy and the Serb-Croat-Slovene state (Jugo-Slavia) on the south, Hungary on the east, the Czecho-Slovak state (Czecho-Slovakia) on the north, and Germany on the north and west. The treaty of peace with Austria (September, 1919) provided for boundary commissions to trace the new frontiers on the ground. Capital, Vienna.

The history of Austria up till the date of the armistice, November 3, 1918, will be found in the article on Austria-Hungary. The proclamation announcing the abdication of Charles I, as Emperor of Austria-Hungary, was issued November 11, 1918. Attempts were made to oust the conservative government, which had organized a republic under the presidency of Karl Seitz, and replace it with a Bolshevik government, but these efforts were put down in spite of the vigorous propaganda work of the Communists of Hungary, who had temporarily taken control of that state. An incomplete draft of the treaty of peace was handed to the Austrian delegation, headed by Dr. Karl Renner, Chancellor, on June 2, 1919, at St. Germain, Paris. The terms of the treaty were harsh, and at a session of the National Assembly President Seitz characterized the treaty as Austria's death sentence. The Communists took advantage of the popular indignation, and it was with great difficulty they were

quelled. The Austrian delegates were again summoned to St. Germain, and on July 20 received the complete text of the treaty. On September 7 the Austrian National Assembly, by a vote of 97 to 23, resolved to sign the treaty though protesting against 'the violation of Austria's right of free disposal of herself.' There was a strong desire among the Austrians to unite with the German Republic, a desire that was reciprocated by the Germans, but the treaties forbade this union. On September 10, 1919, Dr. Karl Renner signed the treaty at St. Germain. By its terms the former Austrian Empire was reduced to what is known as German Austria, including Upper and Lower Austria and parts of Styria and Tyrol. The indemnities which Austria must pay were to be decided by the Reparation Commission. The Austrian army was reduced to 30,000 and conscription abolished. All Austrian warships were surrendered. Construction or acquisition of submarines, even for commercial purposes, was forbidden in Austria. (See *Treaty*.)

Austria-Hungary, formerly an extensive duplex monarchy in Central Europe inhabited by several distinct nationalities, and consisting of two independent states, each with its own parliament and government, but with one common head of the state, who bore the title of Emperor of Austria and Apostolic King of Hungary, and with a common army and navy and system of diplomacy, and also with a common parliament. At the beginning of the European war (q. v.) Austria-Hungary had a total area of about 260,000 square miles. It was bounded s. by Roumania, Servia, and Montenegro; w. by the Adriatic Sea, Italy, Switzerland and the German Empire; E. by Russia and Roumania; N. by the German Empire and Russia.

Besides the two great divisions of Austria proper, or 'Cisleithan' Austria and Hungary or 'Transleithan' Austria, the Austro-Hungarian monarchy was divided into a number of governments or provinces as follows:

Austrian Empire: Lower Austria, Upper Austria, Salzburg, Styria, Carinthia, Carniola, Trieste, Görz and Gradisca, Istria, Tyrol, Vorarlberg, Bohemia, Moravia, Silesia, Galicia, Bukowina, Dalmatia. Pop. 28,571,934.

Hungarian Kingdom: Hungary, Transylvania, Fiume, Croatia and Slavonia. Pop. 20,886,487.

Belonging to the former Austro-Hungarian monarchy: Bosnia, Herzegovina. Pop. 1,931,802.

The Austrian Empire had an area of 115,831 square miles; the Hungarian Kingdom, 125,641 square miles; Bosnia

Austria-Hungary

Austria-Hungary

and Herzegovina, 10,760 square miles; total area of late dual monarchy, 261,241; total population, 51,390,223.

The great war of 1914-18 (see *European War*), resulted in the dismemberment of this great empire, part of it going to Italy, part to Roumania, part to the reconstructed state of Poland, the remainder being divided into the separate states of Austria, Czecho-Slovakia, Hungary, and Jugo-Slavia (the Serb-Croat-Slovene State). See the articles under each head.

The prevailing character of the territory formerly included in Austria-Hungary is mountainous or hilly, the plains not occupying more than a fifth part of the whole surface. The loftiest ranges belong to the Alps, and are found in Tyrol, Styria, Salzburg, and Carinthia, the highest summits being the Ortlerspitze (12,814 ft.) on the western boundary of Tyrol, and the Grossglockner (12,360) on the borders of Salzburg, Tyrol and Carinthia. Another great range is that of the Carpathians, bounding Hungary on the north. The most extensive tracts of low or flat land, much of which is very fertile, occur in Hungary, Galicia, and Slavonia, the great Hungarian plain having an area of 36,000 square miles. They stretch along the courses of the rivers, of which the chief are the Danube, with its tributaries, the Save, the Drave, the Theiss, the Maros, the Waag, the March, the Raab, the Inn; also the Elbe and Moldau and the Dniester. The Danube for upwards of 800 miles is navigable for fairly large vessels; the tributaries also are largely navigable. The lakes are numerous and often picturesque, the chief being Lake Balaton or the Plattensee. The climate is exceedingly varied, but generally favorable. The principal products of the north are wheat, barley, oats, and rye; in the center vines and maize are added; and in the south olives and various fruits. The cereals grow to perfection, Hungarian wheat and flour being celebrated. Other crops are hops, tobacco, flax, and hemp. Wine is largely made, but the wines are inferior on the whole, with exception of a few kinds, including Tokay. The forests cover 70,000 square miles, or one-third of the productive soil of the empire. Sheep and cattle are largely reared.—Wild deer, wild swine, chamois, foxes, lynxes, and a species of small black bear are found in many districts, the fox and lynx being particularly abundant. Herds of a small native breed of horses roam wild over the plains of Hungary.—In mineral productions the territory is very rich, possessing, with the exception of platinum, all the useful metals, the total annual value of the mineral products of the Austrian Empire being estimated at upwards of

\$60,000,000, the principal being coal, salt, and iron.

At the beginning of the war manufactures were in the most flourishing condition in Bohemia, Moravia, Silesia, and Lower Austria; less so in the eastern provinces, and insignificant in Dalmatia, Bukowina, Herzegovina, etc. Among the most important manufactures were those of machinery and metal goods, Austria holding a high place for the manufacture of musical and scientific instruments, gold and silver plate, and jewelry; of stone and china-ware, and of glass, which is one of the oldest and most highly developed industries in Austria; of chemicals; of sugar from beet; of beer, spirits, etc., and especially the manufactures of tobacco, woolen, cotton, hemp, and flax.

None of the European States, except Russia, exhibited such a diversity of race and language as the former Austrian Empire. The Slavs—who differ greatly, however, among themselves in language and civilization—amounted to above 22,000,000 or nearly half the total population, and form a great mass of the population of Bohemia, Moravia, Carniola, Galicia, Dalmatia, Croatia, and Slavonia, and Northern Hungary, and half the population of Silesia and Bukowina. The Germans, about 11,500,000, form almost the sole population of Austria, Salzburg, the greatest portion of Styria and Carinthia, almost the whole of Tyrol and Vorarlberg, large portions of Bohemia and Moravia, the whole of West Silesia, etc.; and they are also numerous in Hungary and Transylvania. The Magyars or Hungarians (8,750,000) form the bulk of the inhabitants of the Kingdom (now the Republic) of Hungary and Eastern Transylvania. Of the Italic or Western Romanic stock there are about 700,000, and in the southeast about 3,000,000 of the Roumanian or Eastern Romanic stock. The number of Jews is above 1,000,000; and there are other races, such as the Gypsies (100,000), who are most numerous in Hungary and Transylvania, and the Albanians in Dalmatia.

Government.—The ruler of the Austro-Hungarian monarchy had the title of emperor so far as concerned his Austrian dominions, but he was only king of Hungary. All matters affecting the joint interests of the two divisions of the empire, such as foreign affairs, war, and finance, were dealt with by a supreme body known as the Delegations—a parliament of 120 members, one-half of whom were chosen by and represented the legislature of German Austria and the other half that of Hungary. The legislative center of the Austrian division of the empire was the Reichsrath, or council of the realm, consisting of an upper house (Herrenhaus),

Austria-Hungary

Austria-Hungary

composed of princes of the imperial family, nobles with the hereditary right to sit, archbishops and life-members nominated by the emperor; and a lower house (Abgeordnetenhaus) of 516 elected deputies. There were seventeen provincial diets or assemblies, each provincial division having one. In the Hungarian division of the empire the legislative power was vested in the king and the diet or Reichstag conjointly, the latter consisting of an upper house or house of magnates and of a lower house or house of representatives, the latter elected by all citizens of full age paying direct taxes to the amount of four dollars a year. The powers of the Hungarian Reichstag corresponded to those of the Reichsrath of the Cisleithan provinces. There being three distinct parliaments in the empire, there were also three budgets, viz., that for the whole empire, that for Cisleithan, and that for Transleithan Austria.

Military service was obligatory on all citizens capable of bearing arms who had attained the age of twenty. The period of service was twelve years, of which three were passed in the line, seven in the reserve, and two in the landwehr. The army numbered over 400,000 men (including officers) on the peace footing and over 3,600,000 on the war footing. The Austrian navy at the time of the armistice of November, 1918, consisted of 15 battle-ships, 21 torpedo boat destroyers, 10 torpedo gunboats, 45 submarines, besides monitors, scouts, etc. All warships were surrendered in accordance with the peace treaty of 1919. (See *Treaty*.)

History.—In 791 Charlemagne drove the Avars from the territory between the Enns and the Raab, and united it to his empire under the name of the *Eastern Mark* (that is March or boundary land); and from the establishment by him of a margraviate in this new province the present empire took its rise. On the invasion of Germany by the Hungarians it became subject to them from 900 till 955, when Otho I, by the victory of Augsburg, reunited a great part of this province to the German Empire, which by 1043 had extended its limits to the Leitha. The margraviate of Austria was hereditary in the family of the counts of Babenberg (Bamberg) from 982 till 1156, in which year the boundaries of Austria were extended so as to include the territory above the Enns and the whole was created a duchy. The territory was still further increased in 1192 by the gift of the duchy of Styria as a fief from the Emperor Henry VI, Vienna being by this time the capital. The male line of the house of Bamberg became extinct in 1246, and the Emperor

Frederick II declared Austria and Styria a vacant fief, the hereditary property of the German emperors. In 1282 the Emperor Rudolph granted Austria, Styria, and Carinthia to his two sons, Albert and Rudolph. The former became sole ruler (duke), and since then Austria has been under the still reigning house of Hapsburg. Albert, who was an energetic ruler, was elected emperor in 1298, but was assassinated in 1308. The first of his successors, we need specially mention, was Albert V, son-in-law of the Emperor Sigismund. He assisted Sigismund in the Hussite wars, and was elected after his death King of Hungary and of Bohemia, and German King (1438). Ladislaus, his posthumous son, was the last of the Austrian line proper, and its possessions devolved upon the collateral Styrian line in 1457; since which time the house of Austria furnished an unbroken succession of German emperors.

In 1453 the Emperor Frederick III, a member of this house, had conferred upon the country the rank of an archduchy before he himself became ruler of all Austria. His son Maximilian I, by his marriage with Mary, the surviving daughter of Charles the Bold, united the Netherlands to the Austrian dominions. After the death of his father in 1493 Maximilian was made Emperor of Germany, and transferred to his son Philip the government of the Netherlands. He also added to his paternal inheritance Tyrol, with several other territories, particularly some belonging to Bavaria, and acquired for his family new claims to Hungary and Bohemia. The marriage of his son Philip to Joanna of Spain raised the house of Hapsburg to the throne of Spain. Philip, however, died in 1506, and the death of Maximilian in 1519 was followed by the union of Spain and Austria; his grandson (the eldest son of Philip), Charles I, king of Spain, being elected Emperor of Germany as Charles V. Charles thus became the greatest monarch in Europe, but in 1521 he ceded to his brother Ferdinand all his dominions in Germany. Ferdinand I, by his marriage with Anna, the sister of Louis II, king of Hungary, acquired the kingdoms of Hungary and Bohemia, with Moravia, Silesia, and Lusatia, the appendages of Bohemia. To oppose him the waywode of Transylvania, John Zapolya, sought the help of the sultan, Soliman II, who appeared in 1529 at the gates of Vienna, but was compelled to retreat. In 1535 a treaty was made by which John von Zapolya was allowed to retain the royal title and half of Hungary.

but after his death new disputes arose, and Ferdinand maintained the possession of Lower Hungary only by paying Soliman the sum of 30,000 ducats annually (1562). In 1556 Ferdinand obtained the imperial crown, when his brother Charles laid by the scepter for a cowl. He died in 1564, leaving his territories to be divided among his three sons.

Maximilian II, the eldest, succeeded his father as emperor, obtaining Austria, Hungary, and Bohemia; Ferdinand, the second son, received Tyrol and Hither Austria; and Charles, the youngest, obtained Styria, Carinthia, Carniola, and G6ra. Maximilian died in 1576, and was succeeded in the imperial throne by his eldest son Rudolph II, who had already been crowned King of Hungary in 1572, and King of Bohemia, in 1575. Rudolph's reign was distinguished by the war against Turkey and Transylvania; the persecutions of the Protestants, who were driven from his dominions; the cession of Hungary in 1608; and in 1611 of Bohemia and his hereditary estates in Austria to his brother Matthias. Matthias, who succeeded Maximilian on the imperial throne, concluded a peace with the Turks, but was disturbed by the Protestant Bohemians, who took up arms in defense of their religious rights, thus commencing the Thirty Years' War. After his death in 1619 the Bohemians refused to acknowledge his successor, Ferdinand II, until after the battle of Prague in 1620, when Bohemia had to submit, and was deprived of the right of choosing her king. Lutheranism was strictly forbidden in all the Austrian dominions. Hungary, which revolted under Bethlen Gabor, Prince of Transylvania, was, after a long struggle, subdued. During the reign of Ferdinand III (1637-57), successor of Ferdinand II, Austria was continually the theater of war; Lusatia was ceded to Saxony in 1635; and Alsace to France in 1648, when peace was restored in Germany by the treaty of Westphalia.

The Emperor Leopold I, son and successor to Ferdinand III, was victorious through the talents of Eugene in two wars with Turkey, and Vienna was delivered by Sobieski and the Germans from the attacks of Kara Mustapha in 1683. In 1687 he united Hungary to Transylvania, and in 1699 restored to Hungary the country lying between the Danube and the Theiss. It was the chief aim of Leopold to secure to Charles, his second son, the inheritance of the Spanish monarchy, and in 1701, upon the victory of French diplomacy in the appointment of the grandson of Louis

XIV, the war of the Spanish succession commenced. Leopold died in 1705, but Joseph I, his eldest son, continued the war. As he died without children in 1711, his brother Charles was elected emperor, but was obliged to accede in 1714 to the Peace of Utrecht, by which Austria received the Netherlands, Milan, Mantua, Naples, and Sardinia. In 1720 Sicily was given to Austria in exchange for Sardinia. This monarchy now embraced over 190,000 square miles; but its power was weakened by new wars with Spain and France. In the peace concluded at Vienna (1735 and 1738) Charles was forced to cede Naples and Sicily to Spain and part of Milan to the King of Sardinia; and in 1739, by the Peace of Belgrade, he was obliged to transfer to the Porte Belgrade, Servia, etc., partly in order to secure the succession to his daughter Maria Theresa by the Pragmatic Sanction. He died in 1740.

On the marriage of Maria Theresa with Francis, Duke of Lorraine (the dynasty henceforth being that of Hapsburg-Lorraine), and her accession to the Austrian throne, the empire was threatened with dismemberment. Frederick II of Prussia subdued Silesia; the Elector of Bavaria was crowned in Linz and Prague, and in 1742 chosen emperor under the name of Charles VII; Hungary alone supported the heroic and beautiful queen. Charles, however, died in 1745, and the husband of Theresa was crowned Emperor of Germany as Francis I; but a treaty concluded in 1745 confirmed to Frederick the possession of Silesia and by the Peace of Aix-la-Chapelle, 1748, Austria was obliged to cede the duchies of Parma, Piacenza, and Guastalla to Philip, Infant of Spain, and several districts of Milan to Sardinia. To recover Silesia Maria Theresa formed an alliance with France, Russia, Saxony, and Sweden, and entered upon the Seven Years' War; but by the Peace of Hubertsberg, 1763, Silesia was recognized as Prussian territory. On the death of Francis I in 1765 Joseph II, his eldest son, was appointed to assist his mother in the government and elected Emperor of Germany. The partition of Poland (1772) gave Galicia and Lodomeria to Austria, which also obtained Bukovina from the Porte in 1777. At the death of the empress in 1780 Austria contained 235,000 square miles with a pop. estimated at 24,000,000.

The liberal home administration of the empress was continued and extended by her successor, Joseph II, who did much to further the spread of religious toler-

ance, education, and the industrial arts. The Low Countries, however, revolted, and he was unsuccessful in the war of 1788 against the Porte. His death took place in 1790. He was succeeded by his eldest brother, Leopold II, under whom peace was restored in the Netherlands and in Hungary, and also with the Porte. Actuated by the threat of war from the French Assembly in 1792, he formed an alliance with Prussia, but died, March 1, before the French revolutionary war broke out.

His son Francis II, succeeded, and was elected German emperor, by which time France had declared war against him as King of Hungary and Bohemia. In 1795, in the third division of Poland, West Galicia fell to Austria, and by the Peace of Campo-Formio (1797) she received the largest part of the Venetian territory as compensation for her loss of Lombardy and the Netherlands. In 1799 Francis, in alliance with Russia, renewed the war with France until 1801, when the peace of Lunéville was concluded. In 1804 Francis declared himself hereditary Emperor of Austria as Francis I, and united all his states under the name of the Empire of Austria, immediately taking up arms once more with his allies Russia and Great Britain against France. The war of 1805 was terminated by the Peace of Pressburg (Dec. 26), by which Francis had to cede to France the remaining provinces of Italy, as well as to give up portions of territory to Bavaria, Wurtemberg, and Baden, receiving in return Salzburg and Berchtesgaden. After the formation of the Confederation of the Rhine (July 12, 1806) Francis was forced to resign his dignity as Emperor of Germany, which had been in his family more than 500 years. A new war with France in 1809 cost the monarchy 42,380 square miles of territory and 3,500,000 subjects. Napoleon married Maria Louisa, daughter of the emperor, and in 1812 concluded an alliance with him against Russia. But in 1813 Francis again declared war against France, and formed an alliance with Britain, Russia, Prussia, and Sweden against his son-in-law. By the Congress of Vienna (1815) Austria gained Lombardy and Venetia, and recovered, together with Dalmatia, the hereditary territories which it had been obliged to cede.

In the troubled period following the French revolution of 1830 insurrections took place in Modena, Parma, and the Papal States (1831-32), but were suppressed without much difficulty; and though professedly neutral during the

Polish insurrections Austria clearly showed herself on the side of Russia, with whom her relations became more intimate as those between Great Britain and France grew more cordial. The death of Francis I (1835) and accession of his son Ferdinand I made little change in the Austrian system of government, and much discontent was the consequence. In 1846 the failure of the Polish insurrection led to the incorporation of Cracow with Austria. In Italy the declarations of Pio Nono in favor of reform increased the difficulties of Austria, and in Hungary the opposition under Kossuth and others assumed the form of a great constitutional movement. In 1848, when the expulsion of Louis Philippe shook all Europe, Metternich found it impossible any longer to guide the helm of state, and the government was compelled to admit a free press and the right of citizens to arms. Apart from the popular attitude in Italy and in Hungary, where the diet declared itself permanent under the presidency of Kossuth, the insurrection made equal progress in Vienna itself, and the royal family, no longer in safety, removed to Innsbruck. After various ministerial changes the emperor abdicated in favor of his nephew, Francis Joseph; more vigorous measures were adopted; and Austria, aided by Russia, reduced Hungary to submission.

The year 1855 is memorable for the Concordat with the pope, which put the educational and ecclesiastical affairs of the empire entirely into the hands of the Papal see. In 1859 the hostile intentions of France and Sardinia against the possessions of Austria in Italy became so evident that she declared war by sending an army across the Ticino; but after disastrous defeats at Magenta and Solferino she was compelled to cede Milan and the northwest portion of Lombardy to Sardinia. In 1864 she joined with the German states in the spoliation of Denmark, but a dispute about Schleswig-Holstein involved her in a war with her allies (1866), while at the same time Italy renewed her attempts for the recovery of Venice. The Italians were defeated at Custoza and driven back across the Mincio; but the Prussians, victorious at Königgrätz (or Sadowa), threatened Vienna. Peace was concluded with Prussia on Aug. 23 and with Italy on Oct. 3, the result of the war being the cession of Venetia through France to Italy and the withdrawal of Austria from all interference in the affairs of Germany.

Since 1866 Austria has been occupied chiefly with the internal affairs of the

empire. Hungarian demands for self-government were finally agreed to, and the Empire of Austria divided into the two parts already mentioned—the Cisleithan and the Transleithan. This settlement was consummated by the coronation of the Emperor Francis Joseph I, at Budapest, as King of Hungary, on the 8th of June, 1867. In the same year the Concordat of 1855 came up for discussion, and measures were passed for the re-establishment of civil marriage, the emancipation of schools from the domination of the church, and the placing of different creeds on a footing of equality. The fact of the Austro-Hungarian dominions comprising so many different nationalities has always given the central government much trouble, both in regard to internal and to external affairs. In regard to the 'Eastern Question,' for instance, the action of Austria has been hampered by the sympathies shown by the Magyars for their blood relations, the Turks, while the Slavs have naturally been more favorable to Russia. During the war between Russia and Turkey in 1877-78 Austria remained neutral; but at its close, in the middle of 1878, it was decided at the Congress of Berlin, that the provinces of Bosnia and Herzegovina should be administered by Austria.

The annexation of Bosnia and Herzegovina by Austria in 1908 was bitterly resisted by Serbia. The Servians had long cherished the ambition of becoming the center of a great Slavonic dominion. It was to link up with itself Bosnia and Herzegovina, Slavonia and Dalmatia, Montenegro and Sanjak of Novi Bazar. A new empire was to arise in the south of Europe. This little race, surrounded by powerful neighbors, aimed high and knew no fear. This great ambition interfered with the aims of Austria, for the Austrians, following the annexation of Bosnia and Herzegovina, might be expected to extend their control of Balkan states. Thus there smoldered an undercurrent of hatred between the two countries. A vast amount of material good was accomplished by Austria in the annexed provinces; she brought law, order, industry; cities were rebuilt; fresh trade started; coal mines worked; schools opened—but in spite of this material prosperity the people were dissatisfied. They declared in a petition to the Hague conference that 'the Austrian domination is a thousand times more insupportable than that of the Turks.' The people were encouraged in this discontent by the Servians who would not let the Pan-Slav movement die. This conflict of ambitions culminated in the great war that spread over the world.

On Sunday, June 28, 1914, a student

named Prinsep, shot and killed the Archduke Francis Ferdinand, heir to the Austria-Hungary throne, and his wife, the Duchess of Hohenberg, in Serajevo, the capital of Bosnia. Austria, affirming that the Servian government had abetted the crime, put forward certain demands, some of which Serbia refused to comply with, and a declaration of war followed. The conflict involved nearly all the nations of the earth. Germany, Bulgaria and Turkey joined with the Austro-Hungarians. Russia, France, England, Japan, Italy, and the United States were among the great nations taking their stand against the central powers. The United States declared war on Austria-Hungary December 7, 1917. (See *European War*.) Following the peace concluded with Russia, February 10, 1918 (see *Russia*), the Austrians attempted to rout the Italian army, but failed. Instead, the Italians counter-attacked in a series of irresistible strokes, culminating in a terrific offensive in October that compelled Austria to retire from the war. The armistice was signed November 3, 1918. The Austrian casualties were estimated at 4,500,000; expenditures in money, \$25,000,000,000. Austria owed \$2,736,000,000 at the beginning of the war. At its end the debt was \$26,332,000,000, exclusive of war indemnities. The emperor, Francis Joseph, died November 21, 1916. Charles I, who succeeded him, abdicated in November, 1918.

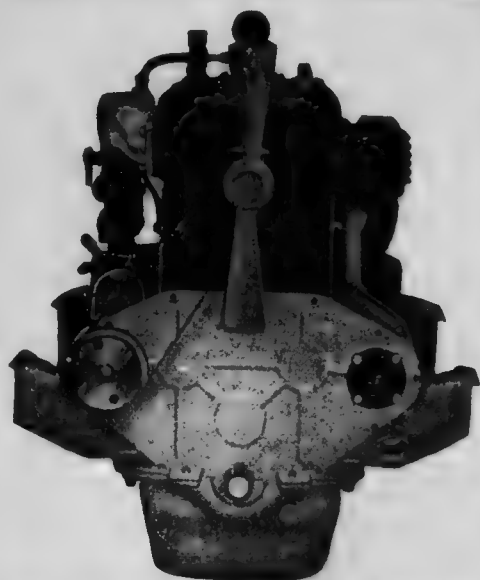
Auto Da Fe (ou'tô-dâ-fâ'), or **AUTO DE FE**, lit. 'act of faith.'

See *Inquisition*.

Autograph own handwriting; an (â'tô-graf), a person's original manuscript or signature, as opposed to a copy. The practice of collecting autographs or signatures dates at least from the sixteenth century, among the earliest collections known being those of Loménie de Brienne and Lacroix du Maine.

Automobile (â-tô-mô'bîl or â-tô-mô-bêl'), a self-propelled vehicle; one moved by other than animal power and adapted to common roads and streets. The term includes vehicles used for passengers and freight, but not traction engines used to draw a train of trucks or vans, nor carriages or cars fitted to travel on special tracks, as railway and street cars. For the origin of vehicles of this type we may go back as far as 1770, when Nicholas Cugnot, a French inventor, built two steam road-carriages, one of which is still in existence, in the Conservatoire des Arts et Metiers, at Paris. Several others were produced during the 18th century, one by Oliver Evans of Philadelphia, which propelled itself for some distance through the streets of that city. The first that

actually ran in England was built by Richard Trevithick in 1802. This propelled itself for 90 miles to London, where

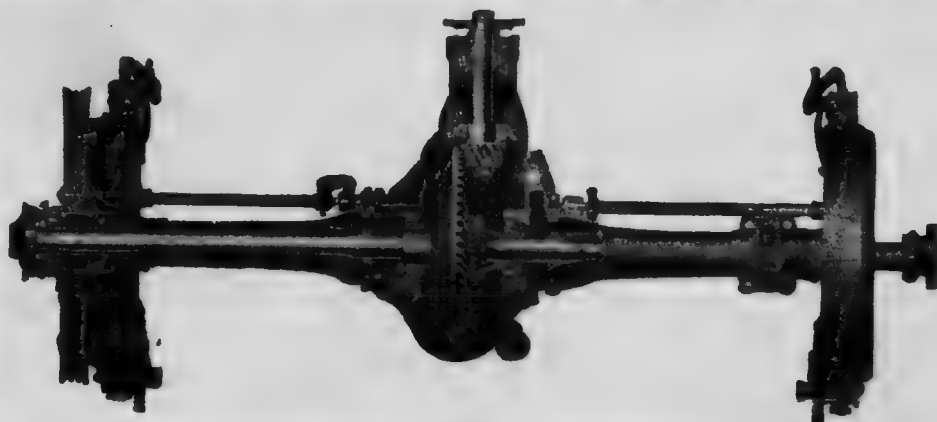


Front view of motor showing fan and timing gear case. At the bottom is the oil reservoir.

it was to be exhibited. Between 1827 and 1837 Walter Henwick produced a number of steam wagons, used for passenger service. One of these, the 'Automaton,' ran for 20 weeks, and carried in all over 12,000 passengers. The modern era of automobile construction began with the perfecting of the internal-combustion en-

automobiles of much finer construction and higher speed made their appearance, especially in France, where they became earlier popular than in other countries. The weak construction of these machines and their liability to frequent accidents and breakages stood in the way of their general adoption, and it was not until the earlier years of the twentieth century that they became widely popular. Within recent years they have been greatly perfected in strength and facility of operation and the number of them in use in the United States and elsewhere has grown enormously. Frequent exhibitions and racing contests have added greatly to their popularity, and their power and speed have so greatly increased that stringent laws limiting the speed of travel in cities and on country roads have been enacted for the prevention of accidents. As early as 1902 Angieres, of Paris, made a record mile in 48 seconds, and since then considerably higher speeds have been attained. The highest so far recorded is a mile in 25.40 seconds, on April 23, 1911. Numerous records at greater distances have been made. The fact that the automobile had its early development in France is indicated by the terms employed in the industry, such as *chauffeur*, *garage*, *chassis*, *tonneau*, *limousine*, and a number of others of French origin.

The Automobile Club of France, founded in 1896, with its headquarters in Paris, conducted many international racing events. The Gordon-Bennett Cup was won in 1900 by Charron; speed, 38.5 miles per hour; in 1901 by Girardot, 35.5 miles



Section of rear axle showing spiral bevel driving gears, brakes and wheel bearings.

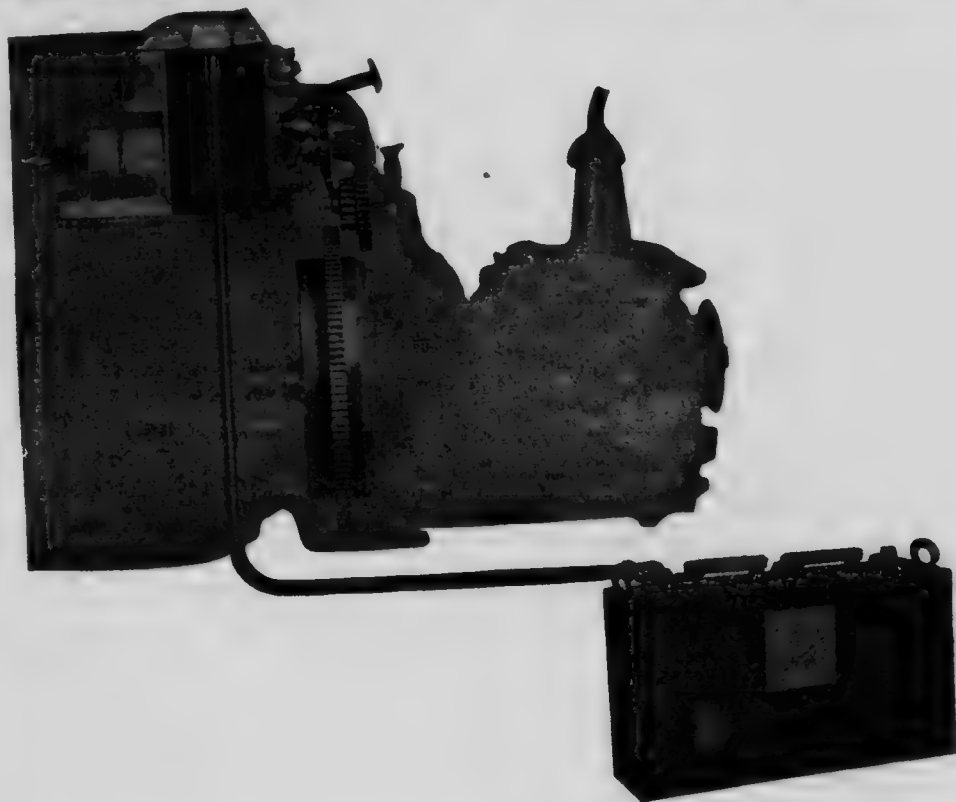
gine, with gasoline or naphtha as fuel, and the development of the electric-storage motor battery (*q. v.*). In the final decade of the nineteenth century

per hour; in 1902 by S. F. Edge, 34 miles per hour; in 1903 by Tenatzy, 49 1/4 miles per hour. The Grand Prix superseded the Gordon-Bennett Cup and was won in

1903 by Saiss (France), Renault car, 63 miles per hour. In 1907 Nazarro (Italy) won with a Fiat car, 70 miles per hour; in 1908 Lautenschlager (Germany) with a Mercedes car, 62 miles per hour; in 1913 Boillot (France), Peugeot car, 72 miles per hour.

In 1907 a race was run from Pekin to Paris. The route crossed the Gobi desert, Siberia, Russia, and Germany. The start was made on June 10. Prince Borghese

bicycle in 1885, Panhard and Levassor constructed the first automobile in 1894, using the Daimler motor. It was Levassor who devised the transmission system, which, so far as the general scheme is concerned, has been continued in all makes of cars. He placed his engine in front, the axis of the crank-shaft parallel with the sides of the vehicle. The drive was through a clutch to a set of reduction gears and thence to a differential



Starting and lighting system showing motor-generator, gears to flywheel and storage battery.

arrived first in Paris, August 10. He used a 40-horsepower Itala car. In 1908 an around-the-world race was won by a Thomas car. The route was New York to San Francisco, ship to China, Pekin to Paris.

In America the Vanderbilt Cup race has been a feature of recent years. In 1911 a 300-horsepower Benz racer traveled one mile at a speed of 141.7 miles an hour at Ormond Beach in Florida.

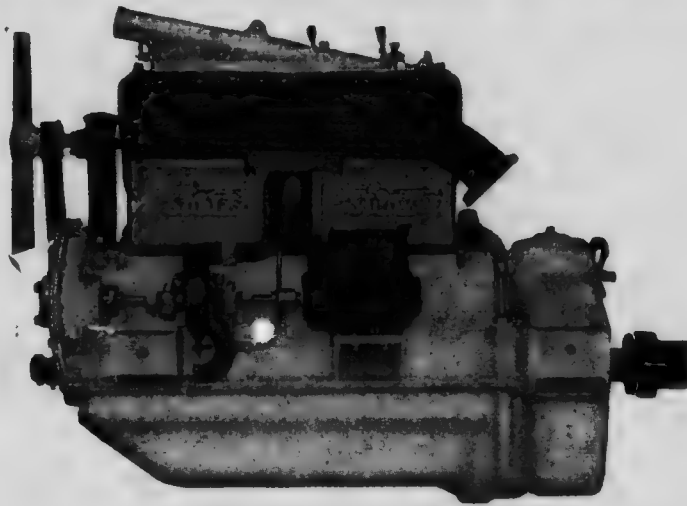
The honor of having led in the development of the automobile belongs to France. Following the invention of Daimler's gasoline engine which had been fitted to a

gear on a countershaft from which the road wheels were chain driven. Except in the case of some makes of heavy trucks there are few chain-driven motor vehicles to-day. But the Levassor combination of clutch, gear box and transmission remains practically unchanged. In 1885 Benz produced a motor tricycle, using a gas engine. Daimler exhibited his double-cylinder V-type engine in 1889, while in 1893-4 Serpollet succeeded with his steam carriage. Electric motors for automobiles were experimented with in this latter period and proved practical. The steam-driven car attained great popularity for

a time, but was displaced by the gasoline engine, though the demand for the "steamer" is becoming evident again. The electric vehicle is more in evidence as a town car and for paved and level streets. The great majority of cars to-day are driven by gasoline engines.

The gasoline automobile may be briefly described as follows: The chassis is the gear and mechanical parts of the car. The body is the upper section erected upon the chassis; it is of various designs. Of the open type, are touring cars, club cars and roadsters; of the glass-enclosed type are limousines, landaulets, coupés, broughams and sedans. At the fore part of the chassis is the motor, usually a four-

more or less complicated system for supplying lubricating oil to engine bearings and cylinders. When the power has been produced on the crank-shaft of the engine it is transmitted through a friction clutch to a shaft conveying the power to the rear wheels; behind the clutch are the change speed gears—termed the transmission—which enables the wheels to be driven at varying speeds while the engine is running at a constant rate. Attached to the rear axle is a differential gear which enables either of the rear wheels to be turned independently of the other in rounding curves, and both to be driven at a uniform rate when the car is proceeding in a straight line. That part of the shaft



Modern four-cylinder 16-valve motor. Exhaust side showing water pump and electric generator.

or six-cylinder, or more recently an eight-cylinder (two blocks of four cylinders each, at an angle of 90° to each other) or a twin-six (twelve cylinders, arranged in blocks of six at an angle of 60° to each other). The motor has to be provided with several external devices which may be classified as separate systems. There is first a complicated system of gasoline supply, including the supply tank and carburetor or mixing device; secondly, as the engine gets hot in working, the cylinders in which the explosions take place need to be cooled by a system of water or air circulation; third, as the mixture of gasoline vapor and air is ignited by an electric spark the whole arrangement of magneto or generator, battery, induction coil, and spark-timing device is termed the electric ignition system, with which is usually combined a complete electric lighting and motor-starting system; fourth, a

lying between the transmission and the differential gear is provided with universal joints, which allow the rear wheels to rise and fall freely as the springs are compressed or released. The drive is usually direct from the shaft through bevel gears to shafts contained in the hollow rear axle. In addition to the engine with its auxiliary devices and the transmitting gears, other mechanical devices are in use, consisting of the brakes, the steering gear, the muffler, for deadening the sound of the explosions, air pumps and the various gauges—speed, air, oil, gasoline, temperature, etc., electric switches and the control devices for governing the speed and direction of movement. A fuller description of the essential parts of a gasoline automobile follows:

Motor. Gasoline motors are of two general types, two-cycle and four-cycle. The *two-cycle* motor consists essentially of

a cylinder with integral cylinder head, which is mounted on a base which contains the crank-shaft bearings and is just large enough to allow for the throw of the crank. This base must be gas tight. The cylinder is fitted with a hollow piston containing a wrist-pin and the piston drives the crank-shaft by means of a connecting-rod with crank and wrist-pin bearings. A carburetor, or other device for mixing gasoline and air in the proper proportions, is connected with the motor base. The cylinder wall contains two ports which are uncovered when the piston reaches its

of the piston or in two cycles. The four-cycle motor is similar in design except that the ports are replaced by mechanically operated valves located at the top of the cylinder. On the down stroke of the piston the inlet valve is opened by a cam on a shaft driven from the crank-shaft by chain or gears. At the end of the down stroke the inlet valve closes and the succeeding upstroke of the piston compresses the charge, which is fired at the top of the piston travel and descends on a power stroke. On the succeeding up stroke the exhaust valve is open and the cylinder



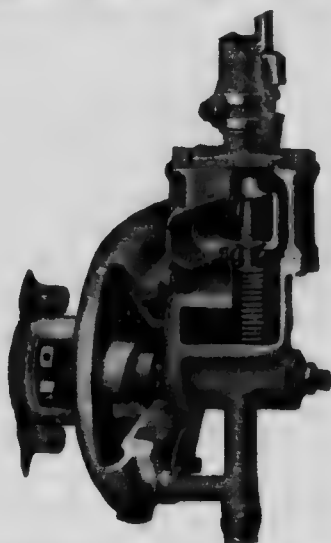
Section of 8-cylinder V-type motor showing valve rocker arm mechanism, water jackets and gas passages.

lowest point. One of these is the exhaust port through which the burned gases go to a muffler, the other an intake port connected with the base of the motor by a short length of pipe. The operation of this type of motor is as follows: With the revolution of the crank-shaft the piston rises to the top of the cylinder, creating a partial vacuum in the base which draws in a charge of gas; the piston then descends until the intake port is uncovered and gas rushes into the cylinder from the base, the charge being deflected away from the exhaust port by a baffle plate on the piston. The rise of the piston compresses the charge, which is fired by an electric spark at the top of the stroke, driving the piston down. Thus a power stroke is accomplished every other stroke

cleansed of burned gases. Thus a cycle of four parts is accomplished, of which only one is a power stroke. On both types of motors a fly-wheel is necessary to carry the crank-shaft through the cycles between power strokes. While the two-cycle type of motor is apparently the more desirable, since it delivers an impulse from each cylinder for every revolution of the crank-shaft, the four-cycle type, which delivers an impulse on every second revolution, has proved the more efficient in practice and is almost universally adopted for automobile purposes. The first machines were equipped with one-cylinder engines, but the vibration increased so rapidly as increased power requirements were met, that more cylinders of smaller dimensions were added and thus two-

cylinder, four-cylinder, six-, eight- and finally twelve-cylinder cars appeared in the attempt to secure high power with a minimum vibration. Other methods of attaining the same end, such as careful balancing of moving parts and counterbalancing of the crank-shaft, have proved successful in large degree. Four-, six-, eight- and twelve-cylinder motors are all being produced by manufacturers of high-grade cars, the advantages of simplicity being claimed by makers of the four- and six-cylinder types, and of flexibility or wide range of driving speeds and smoother operation for the eight- and twelve-cylinder types.

Cooling. To carry off the heat gener-



Centrifugal pump with thermostat attached.

ated by the repeated explosions in the cylinders a cooling system is necessary, the usual type being a water circulating system in which water is passed through a series of water jackets surrounding the cylinders by a centrifugal or gear pump. The hot water is piped from the top of the water jackets to a radiator consisting of a large number of thin tubes surrounded by radiating fins or of a tank pierced by many air tubes. Through the radiator, air is drawn by a fan driven by the engine. The cooled water is drawn from the bottom of the radiator by the pump and forced again through the water jackets. Another system, known as the 'thermo-siphon,' utilizes the principle that hot water rises, to secure circulation and so eliminates the pump. It has been found that an engine should operate at about 180° F. and various devices have

been produced to regulate the temperature to this point. A modern device to automatically control the temperature of the water circulating around the cylinders is an expansion unit or thermostat, to which is attached two poppet valves so placed that they alternately open and close two ports. This unit is in a cylindrical case mounted back of the radiator upper inlet. When the engine is cold the unit is contracted so that the water in the radiator is forced through a by-pass directly down into the suction side of the pump. Thus no water circulates through the radiator and the water in the engine heats up rapidly. When the water becomes heated the unit expands, the by-pass chamber is automatically closed, the port leading into the radiator is opened and water flows into the radiator from the engine.

Air-cooling has been used with great success in certain makes of cars. In one of these air, drawn by a powerful fan in the flywheel back of the motor, passes into a chamber over the cylinders, thence through drums surrounding each cylinder and open at each end and out under the back of the car. Each cylinder is cast with a single wall, on the outside of which are a large number of radiating fins or pins, which rapidly conduct the heat away. The advantages of this system are that a considerable saving of weight is accomplished by eliminating the water, radiator, pump and piping. Furthermore, this system is simpler and free from the troubles of leaking, freezing and boiling which a water-cooling system is liable to.

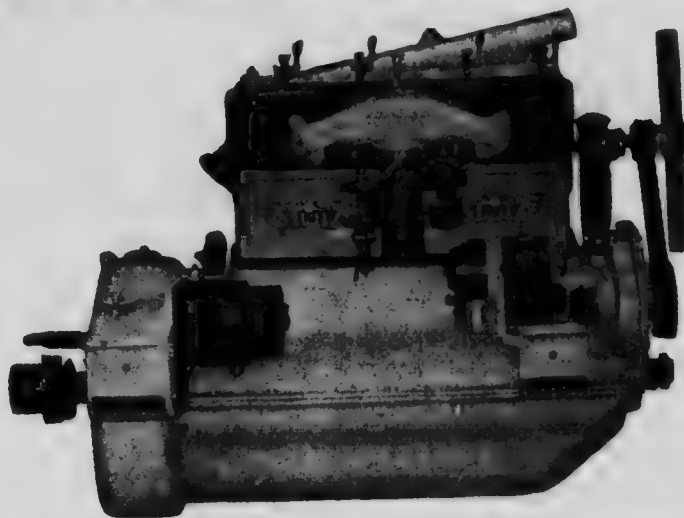
Ignition. In the early days of the automobile the ignition was by three methods—the tube ignition, which was discarded on account of its inflexibility and the impossibility of controlling the ignition so effectually as by electric means; flame ignition, by means of which a flame continually burning was drawn at intervals into the combustion chamber to explode the mixture; and the catalytic method, which took advantage of the curious property possessed by spongy platinum of becoming red hot automatically in hydrogen. As with the tube and flame ignition this method has no flexibility such as is possessed by the electric method. There are two general types of electric ignition, make and break or low tension, and jump spark or high tension. In the first a spark is made within the cylinder by the opening and closing of two contact points, a complicated mechanical system which requires a shaft, cams, push-rods, springs and levers, that has been discarded in large degree. In the jump spark system, the spark is caused to jump between the points of a spark plug, a steel

tube inserted in the cylinder, through the center of which is a rod insulated by porcelain or mica from the tube. Attached to the lower end of the steel tube is a bent wire, which extends to within $1/32$ of an inch of the exposed end of the central rod. A high tension current will jump this gap and fire the charge of gas in the cylinder. One electrode is connected to the central rod, the circuit being completed by using the motor itself as a conductor or ground. A source of high tension (or high voltage) electric current is necessary, which may be either a battery and induction coil with the necessary con-

from the engine shaft, and as soon as the shaft of the engine is made to revolve by means of the starting handle, sparks are generated for igniting the charge at the correct moment.

The Eisemann system comprised a low tension generator and an induction-coil for producing a high-tension spark. It is, however, possible to wind the armature of the magneto with sufficiently fine wire to produce a high-tension current direct from the armature. This is done in the Bosch method, and thus the induction-coil is done away with.

The Delco high-tension type, adapted to



Modern four-cylinder 16-valve motor. Inlet side showing carburetor, magneto and electric starting motor.

tact making and distributing devices to deliver current to each cylinder at the right instant, or a magneto. The magneto, now in wide use, is an electric generator in which the armature revolves in a magnetic field provided by permanent steel magnets. The armature in the case of the magneto machines is simply a shuttle-shaped piece of iron wound from end to end with a number of turns of cotton or silk-covered copper wire. This is mounted on a spindle running in bearings at either end of the system of magnets, and is caused to revolve at one-half engine speed in the magnetic field. The two ends of the wire wound on the armature are brought out to two collecting rings mounted on the spindle outside the bearings. Upon these collecting rings press brushes, to which wires are attached conveying the current to the spark timing and distributing apparatus. The armature is driven by means of gear wheels

an eight-cylinder engine, embodies the following elements: A source of current—the generator, or, at low speeds, the storage battery; an ignition timer, which interrupts the low tension current at the proper instant to produce a spark in the high tension circuit; an induction coil, transforming the primary current of six volts into one of sufficient voltage to jump between the points of the spark plugs; a condenser, which assists the induction coil to raise the voltage, and which protects the contact points of the ignition timer against burning; a high tension distributor, which directs the distribution of the high tension current to the spark plugs in the respective cylinders; a resistance unit, which protects the ignition coil and timer contacts from injury should the ignition circuit remain closed for any considerable length of time with the engine not running. Structurally, the ignition timer, the distributor, the condenser and the resist-

ance unit constitute a single assembly, which is bolted to the rear of the fan-shaft housing. The ignition timer, which is driven by a vertical shaft through spiral gears from the fan-shaft, has two sets of contact points. These share between them the current which would otherwise pass through one. The tendency to spark and corrode the points is ordinarily proportional to the amount of current passing through them. Thus, the use of two sets greatly adds to the life of each. The condenser, which is contained in a water-proof casing at the side of the distributor housing, further protects the contacts against the corrosive action of sparking, and utilizes the tendency to spark to intensify the transformer effect of the induction coil. The induction coil is carried under the cowl on the rear side of the dash. The primary current is interrupted by the timer contacts four times for each revolution of the engine, producing at each break of the primary current a high tension current, which is directed by the distributor to spark plugs in the respective cylinders. The distributor is located directly above the timer, and on the same shaft. It consists of a head or cap of insulating material, carrying one contact in the center, with eight additional contacts placed at equal distances from each other about the center. A rotor, locked to the shaft, maintains constant communication with the center contact, and carries a button which consecutively slides over the eight contacts in the gap.

Lubrication. Lubrication is of great importance in the smooth running of automobiles, and great progress has been made in schemes for supplying oil to the various bearings. A widely adopted method is the hollow crank-shaft through which oil is fed under pressure. A gear pump forces oil from the reservoir in the bottom of the motor through leads to each bearing. In each bearing is an inlet which registers with a hole in the bearing through which the oil is forced. The hollow crank-shaft is kept full of oil by the pressure. There is an outlet in each connecting rod bearing through which these bearings are lubricated. The piston-pin bushings receive lubrication by providing holes in the top to catch the oil spray thrown from the fast-revolving crank-shaft. Other makers cling to the simple 'splash' system in which the oil is drawn from the reservoir and pumped into an oil pan into which the revolving cranks dip and splash the oil over the bearings and cylinder walls. A constant level is maintained in this pan by overflow pipes, which return the oil to the reservoir.

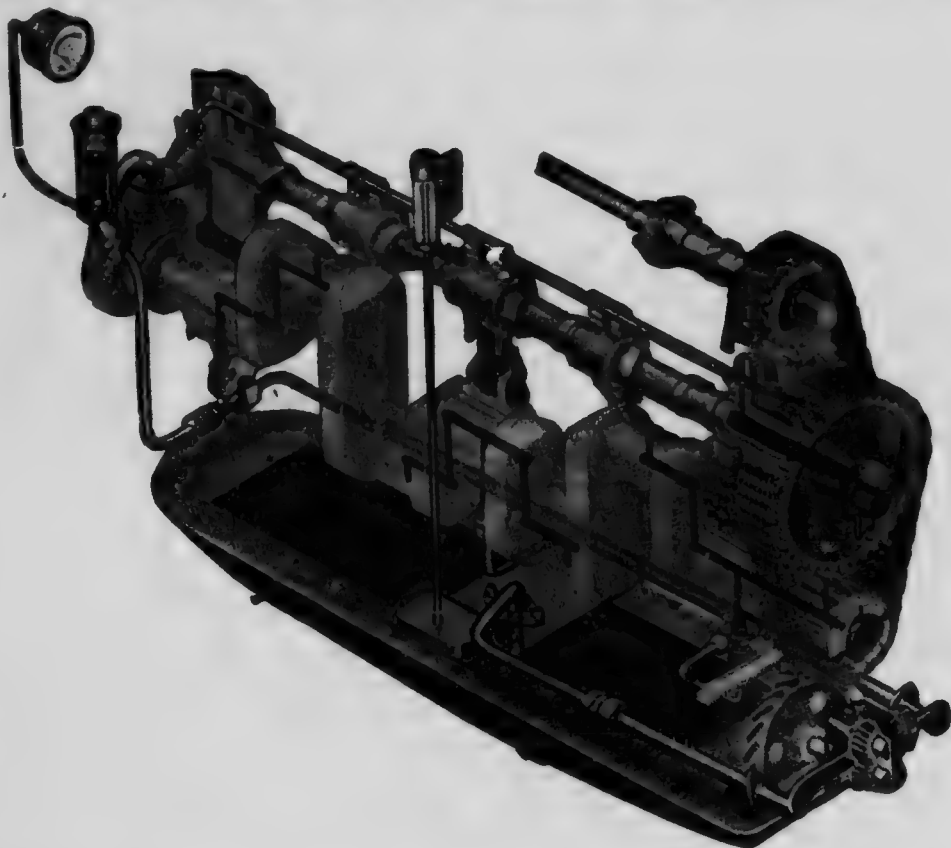
Carburetor. The early form of carbure-

tor, for vaporizing the gasoline and mixing it with the air, was known as the surface carburetor. It consisted of a tank containing the gasoline and presenting a large surface to the air drawn through the tank when the engine was at work. The mere passage of the air across the surface of the volatile liquid saturated it to a sufficient degree, provided the gasoline was warm enough. The spray type succeeded this. It consists of two parts, the float chamber and the spray chamber. In its normal condition the float chamber is nearly full of gasoline and the float floating on the top. When in this position a small needle valve at the base of the chamber is closed and the passage of any further gasoline into the chamber is prevented. When the supply is used up the float sinks, presses against pivoted arms which, in turn, lift the needle valve; then a fresh supply of gasoline runs in, raising the float, and once again the needle valve is closed. The gasoline has free exit from the float chamber into the spray chamber, where a partial vacuum is created when the engine is making the suction stroke. A small quantity of gasoline is sucked through fine tubes in the form of spray, and at the same time a quantity of air is sucked up through the opening at the bottom; the air mixes with the gasoline vapor in the space above the spray maker, and the mixture passes away ready for use in the engine. A small swinging gate is provided at the air entrance, which, when the engine is working slowly, offers some obstruction to the admission of air; but when there is a large demand on the carburetor the air rushing in opens it wider and thus automatically regulates the supply of air to the required actual requirements of the engine. Above the top of the spray chamber is another series of openings for extra air; also there is provided a jacket around the spray chamber into which some of the hot exhaust gases from the exhaust pipe can be introduced. A little plunger is provided for the purpose of agitating the float when starting the engine. By pressing this two or three times a good supply of gasoline is ensured in the spray chamber. In the pipe leading from the carburetor to the engine is introduced a throttle valve, by means of which the quantity of mixture can be controlled. The same principle is applied to later carburetors, but the spray has given place to the single jet, and various other modifications have been introduced.

Transmission and Drive. Since an internal combustion motor is not self-starting in the exact sense, but must be turned by outside means to draw in the

first charge before it can run under its own power, a hand crank is supplied which can be attached to the end of the crank-shaft for this purpose. In modern cars this is supplemented by a small electric motor supplied with current by a storage battery. When the motor is running under its own power this starting motor is driven by it and acts as a

motor gives its highest power when running at or near its highest speed, 1500 to 3000 revolutions per minute. The transmission gearing enables the motor to run at its most efficient speed while driving the car at a moderate rate, thus allowing the driver to climb hills and pull through heavy roads that would not otherwise be possible. The usual practice is to pro-



Pressure oil supply system with pressure gauge and regulator.

dynamo and recharges the battery. An alternative is to supply a separate dynamo, in which case the starting motor runs only when the initial turning movement is to be given to the car motor. To make starting the car motor possible a friction clutch is required to free the motor from the driving wheels. This is of either cone or disc design and is either near or incorporated in the flywheel. The free end of this clutch is connected to the transmission, the function of this gearing being to allow of a variety of speeds between the motor and the rear wheels. The

vide cars with from two to four gear ratios as the weight of the car increases. In the planetary system the gears are controlled by foot pedals, but the usual type is the sliding gear transmission, in which the gears are controlled by a lever by which the desired gears can be slid into mesh. A reverse gear for running the car backwards is also provided. The rear axle varies widely in design, being either solid, live or floating. The solid axle is similar to a wagon axle and simply carries the weight of the car, the wheel drive being by chains from a transverse shaft

or spur gears engaging with large internal meshed gears mounted on the wheels themselves. The *live axle* consists of a tube which carries the weight, within which are two shafts, to the outer ends of which are keyed the wheels. At the inner ends the shafts are driven by differential gearing. The *floating axle* carries the weight of the car and also acts as a bearing for the wheels which are driven by internal shafts, at the outer ends of which are clutches engaging with the wheels.

Aluminum has entered more and more into the construction of automobiles, thus reducing weight. In some cars the structural part of the engine—including cylinder barrels, water jackets, bearing supports and the upper half of the crank case—is molded from aluminum in one piece. Touring bodies, fenders, hoods, radiator shells, parts of the rear axle and transmission case are further examples of the extent to which metallic aluminum now competes with the other sheet metals and with wood. The aluminum surface retains paint well, and the increased rigidity makes the car more durable.

The Steam Car. Among the earliest American automobiles, steam-driven machines held a prominent place. Popular favor, however, soon turned to the gasoline car as the more economical in the use of fuel and less complicated in operation and because of the instantaneous starting feature of the internal explosion engine. Certain makers, however, clung to the steam-driven type and succeeded in developing a car which met most of the objections raised against the early steam machines. Economy was secured by substituting kerosene for gasoline as fuel; operation was made easy by substituting automatic for hand controls of the burner and water supply to the boiler; water, which is used lavishly in the production of steam, was conserved by adding a feed water heater and a condenser, which takes the place of a radiator in the gasoline car. The modern steam-driven car has a number of striking advantages over the gasoline car, as, for instance, the fact that considerable reserve power can be stored and applied in any desired volume to the rear wheels; its engine can develop its maximum power at the lowest speed and it is self-starting without the aid of auxiliary devices; no clutch, no flywheel, and no change speed gears are required and automatic controls render its operation exceedingly simple. Furthermore, it is claimed that the wide range of speeds without gear shifting, smooth starting and the continuous flow of power, lead to econ-

omy of tires and moving parts. In short, it is claimed that the steam car has attained, with a minimum of parts, all that the gasoline car is striving for by an increase of parts, such as additional cylinders, electric starting system, etc. The essentials of a steam car consist of a fire-tube boiler with burner and pilot light; a two-cylinder simple steam engine, geared directly to the rear axle through two spur gears; fuel and water tanks; air and water pumps; condenser and the various hand and automatic control devices. An electric generator with storage battery is added for lighting purposes. In operation water is fed to the boiler by pumps driven continuously from the rear axle, the amount admitted to the boiler being governed by an automatic valve with by-pass. This valve opens when the water level in the boiler sinks below a certain point and closes when the boiler is filled to the right level, opening the by-pass to allow the water to pump back to the supply tank. The boiler consists of a steel drum, through which run vertical tubes open at each end. Under this is the kerosene (or gasoline) burner, lighted by a pilot light, which burns continuously. The main burner is controlled by an automatic valve, which opens when the steam pressure falls below a fixed point. Fuel is forced to the burner by air pressure and the heat from the burner rising through the vertical tubes generates steam which (governed by a hand throttle located near the driver) passes to the engine. The exhaust steam goes to a feed water heater in the tank and thence to the condenser, where it turns into water again and is returned to the tank to be used over again. The driver controls the car by means of a hand throttle, a reverse lever and the usual brakes and steering gear.

The Electric Car. For city use, where runs are short and stops frequent, the electric car, because of its simplicity, cleanliness and ease of control, has become exceedingly popular. It consists essentially of a suitable frame and running gear, a storage battery with capacity for sixty to ninety miles operation on one charge, an electric motor or motors with suitable driving gears and a controller or rheostat and reversing switch. The speed of electric cars is usually limited to not more than twenty-five miles per hour. The battery is charged by connecting it with any suitable source of current and can easily be charged in a night for a full day's operation. Many systems of power transmission are used, the chief methods being either to gear motors to each rear wheel by spur gearing or to drive the rear

wheels by shafts contained in a hollow axle and connected through differential gearing with a motor either by chain or shaft and worm-gear drive.

Motor Trucks. In addition to the large number of machines designed to carry from two to seven passengers, which are still known as 'pleasure' cars, in spite of the general tendency to regard them as utilities and not luxuries, the automobile truck for freight and package delivery has come into wide use and is rapidly replacing the horse-drawn wagon as a more rapid and economical means of transportation. The fact that the motor truck can be kept in practically continuous operation at a speed two to five times greater than that of a horse-drawn wagon, enables it to do the work of from two to four teams. The earliest trucks were steam-driven, but gasoline and electric trucks practically monopolize the field at present. *Electric* trucks are used chiefly in the heart of cities, where the pavements are smooth and stops are frequent. The sizes run from $\frac{1}{2}$ -ton to 6 tons' capacity, with a battery capacity of from 40 to 75 miles on a single charge. The *gasoline* truck, which predominates on American roads, differs from the pleasure car in that it is built much more heavily and strongly to withstand the heavy strains to which it is subjected. These trucks are designed to run at low road speed and withstand severe service. Their capacity varies from $\frac{1}{2}$ -ton for light delivery purposes, to $7\frac{1}{2}$ tons and upwards for handling heavy material, such as coal, sand, gravel, etc. The arrangement of the working parts of a truck is similar to that of a touring car. The engine and radiator are mounted at the forward end of a heavy frame. The engine is connected through a cone or disc clutch with the transmission gearing, which is usually placed close to the engine. The transmission gearing usually supplies three speeds forward and one reverse and this is connected by a shaft either to the rear axle, which is driven by bevel or worm gearing or the shaft drives a transverse shaft, located forward of the rear axle from which the wheels are driven by chains. The chain drive, however, is nearly obsolete and the worm drive is in almost universal use for trucks of large capacity.

In the light delivery car class, which is used by department stores, newspapers, etc., the chassis follows the lines of a pleasure car very closely and, in fact, many makers put out light delivery cars on the same chassis as their pleasure cars with a delivery car body. The general practice is to supply trucks with a rug-

gedly constructed four-cylinder engine of about 20 horsepower for the $\frac{1}{2}$ -ton truck, increasing to 45 to 50 horsepower as the $7\frac{1}{2}$ -ton size is reached. As the size of the truck increases, however, the maximum road speed is lowered, so that the larger truck seldom runs at a speed of more than 12 miles per hour. The wheel base varies from 100 to 200 inches, and while the tread of the light truck is



Irreversible worm and sector steering gear.
The upper shaft extends to the steering wheel, lower arm to steering knuckles.

usually standard, in the larger sizes broad wheels with two tires on each wheel are often used to distribute the wear, and in this case the tread on the rear wheels is about six inches wider than on the front wheels. The wheels are usually of wood of an artillery type proportioned to the heavy load carried, but steel wheels, with a web or disc, instead of spokes, are being rapidly introduced. The weight of trucks varies from 1000 pounds in a light delivery car, to 7500 pounds and upwards for the 5-ton trucks and larger sizes. The style of body used on a truck varies widely with the use to which it is to be put. The usual open body with stake sides is adapted to general hauling, but special steel bodies with hydraulic dumping devices are used for hauling coal and similar materials. Tanks are built on truck chassis for carrying liquids and there are many other special uses to which the motor truck can be put.

Motor fire apparatus has come into wide use and in many motor fire-engines, the same engine which drives the car is

used to drive the pump. The great war in Europe demonstrated most strikingly the important part that trucks play in solving modern transportation problems. The immense supplies of food and ammunition, which had to be moved to the front, could not have been handled without the motor truck. In many cases, trucks have been used for the rapid transport of large bodies of men, which greatly increase the mobility of an army. During periods of railroad congestion the truck has been used to assist the railroads and regular truck services have been placed in operation between the large cities with a view to improving the transportation situation.

Motor vehicles have been of invaluable service in the war. The motor 'busses of London were commandeered for use as munition transports. Early in the war England established an automobile school under the direction of Major General W. G. B. Boyce, whose official title was Director of Transport of the British Armies in France. The faculty was composed of temporary officers who had been employed in the great automobile factories of England; assisting them were hundreds of men from the technical staff of the British General Omnibus Company. This automobile school became the source of man power for the mechanical transport. General Boyce had a staff of 30 inspectors, every one of whom was an automobile expert before the war.

The coming of the automobile has given a new impetus to road building; it has made the country accessible to the city man and the city accessible to the country man; it has transformed life for 'the man with the hoe,' whose horizon was formerly bounded by the fences of his farm, or at best the narrow radius reached by horse and buggy. Now with the astonishingly cheap automobiles the farmer is brought into touch with men and women in cities and no longer lives to himself. In no country in the world is there such a wide distribution of cars as in America. The 'fellowship of the road' has become a current phrase; it helps in the spread of democracy.

According to the National Automobile Chamber of Commerce, automobile exports from the United States reached a total of \$138,289,514 in 1916, an increase of nearly \$13,000,000 over 1915. The exports to Hawaii alone in 1916 from the United States amounted to \$1,900,000, a startling showing when contrasted with the entire exports to all countries from America in 1902, which amounted to less than a million dollars.

Automolite (a-tom'o-lit). See Gal-nite.

Autonomy (a-ton'o-mi), the power of a state, institution, etc., to legislate for itself.

Autoplasty (a'to-plas-ti), the operation by which wounds and diseased parts are repaired with healthy tissue taken from other parts of the same person's body.

Auto-tractor (au-to-trak'tor), a specially designed automobile for hauling wagons or agricultural apparatus, which has to a great extent taken the place of horses on large farms.

Autumn (a'tum) the season between summer and winter, in the northern hemisphere often regarded as embracing August, September, and October, or three months about that time. The beginning of the astronomical autumn is September 22, the autumnal equinox; and the end is December 21, the shortest day. The autumn of the southern hemisphere takes place at the time of the northern spring.

Autun (ô-tup; ancient; *Bibracte*, later *Augustodunum*), a city, South-eastern France, department of Saône-et-Loire. It has two Roman gates of exquisite workmanship, the ruins of an amphitheater and of several temples, the cathedral of St. Lazare, a fine Gothic structure of the eleventh century, manufactures of carpets, woollens, cotton, velvet, hosiery, etc. Pop. (1906) 11,927.

Auvergne (ô-vâr-nyé), a province of Central France, now merged into the departments Cantal and Puy-de-Dôme, and part of the department of Haute-Loire. The Auvergne Mountains, separating the basins of the Allier, Cher, and Creuse from those of the Lot and Dordogne, contain the highest points of Central France; Mont Dore, 6188 feet; Cantal, 6093 feet, and Puy-de-Dôme, 4806 feet. The number of extinct volcanoes and general geological formation make the district one of great scientific interest. The minerals include iron, coal, copper, and lead, and there are warm and cold mineral springs.

Auxerre (ô-sâr), a town of France, department of Yonne, 110 miles S. E. of Paris. Principal edifices: a fine Gothic cathedral, unfinished; the abbey of St. Germain, with curious crypts; and an old episcopal palace, now the Hôtel de Préfecture; it manufactures woollens, hats, casks, leather, earthenware, violin strings, etc., trade, chiefly in wood and wines, of which the best known is white Chablis. Pop. (1906) 16,971.

Auxometer (aks-om'e-tër), an instrument to measure the magnifying powers of an optical apparatus.

Auxonne (ô-son; anc. *Aussone*), a town of France, department of Côte-d'Or (Burgundy), on the Saône; a fortified place, with some manufactures. Pop. (1906) 2768.

Ava (â'vâ), a town in Asia, formerly the capital of Burmah, on the Irrawady, now almost wholly in ruins.

Ava-Ava, *ARVA*, *KAVA*, or *YAVA* (*Macropiper methysticum*), a plant of the nat. order Piperaceæ (pepper family), so called by the inhabitants of Polynesia, who make an intoxicating drink out of it. Its leaves are chewed with betel in Southeastern Asia. It is diuretic and anæsthetic.

Avalanche (av'a-lansh), a large mass of snow or ice precipitated from the mountains. There are distinctions of wind or dust avalanches, when they consist of fresh-fallen snow whirled like a dust storm into the valleys; sliding avalanches, when they consist of great masses of snow sliding down a slope by their own weight; and glacier or summer avalanches, when ice-masses are detached by heat from the high glaciers. Also applied to masses of earth and rock sliding down mountains.

Aval Islands. Same as *Bahrein Islands*.

Avallon (â-vâ-lôn), a town of Central France, dep. Yonne. Pop. (1906) 5197.

Avalon (av'a-lon), a sort of fairyland or elysium mentioned in connection with the legends of King Arthur, being his abode after disappearing from the haunts of men; called also *Avilion*. The name is also identified with Glastonbury; and has been given to a peninsula of Newfoundland.

Avanturine (a-van'tûr-in), *AVENTURINE*, a variety of quartz containing glittering spangles of mica through it; also a sort of artificial gem of similar appearance.

Avars (av'ars), a nation, probably of Turanian origin, who at an early period may have migrated from the region east of the Tobol in Siberia to that about the Don, the Caspian Sea, and the Volga. They became active in Europe in 555 A.D. when a party of them advanced to the Danube and settled in Dacia. They served in Justinian's army, aided the Lombards in destroying the kingdom of the Gepide, and in the sixth century conquered under their khan Bajan the region of Pannonia. They then won Dalmatia, pressed into Thuringia and Italy against

the Franks and Lombards, and subdued the Slavs dwelling on the Danube, as well as the Bulgarians on the Black Sea. But they were ultimately limited to Pannonia, where they were overcome by Charlemagne, and nearly extirpated by the Slavs of Moravia. After 827 they disappear from history. Traces of their fortified settlements are found, and known as Avarian rings.

Avatar (av-a-târ'), more properly *AVATARA*, in Hindu mythology, an incarnation of the Deity. Of the innumerable avatars the chief are the ten incarnations of Vishnu, who appeared successively as a fish, a tortoise, a boar, etc.

Avatcha (â-vatsl.â), a volcano and bay in Kamchatka. The volcano, which is 9000 ft. high, was last active in 1855. The town of Petropavlovsk lies on the bay.

Aveiro (â-vâ'i-ru), a coast town in Portugal, province of Beira, with a cathedral, an active fishery, and a thriving trade. Pop. 10,012.

Avellino (â-vel-lê'nô), a town in southern Italy, capital of the province of Avellino, 29 m. east of Naples, the seat of a bishop. Avellino nuts were celebrated under the Romans. Pop. 23,760. Area of the prov. 1409; pop. 421,768.

Ave Maria (â've, or â've mâ-rê'â; 'Hall, Mary'), the first two words of the angel Gabriel's salutation (Luke i, 28), and the beginning of the very common Latin prayer to the Virgin in the Roman Catholic Church. It consists of three parts, namely, the words the angel addressed to Mary when he announced to her the Incarnation, those with which Elizabeth saluted her, and those of the Church to implore her intercession. In the devotion of the Rosary, each decade consisting of one Pater and ten Aves, the latter are counted upon the small beads.

Avena (a-vê'na), the oat genus of plants. See *Oat*.

Avens, a European plant, of the genus *Geum*. Common avens, or herb-bennet, *G. urbânum*, possesses astringent properties. The American species, *G. rivale*, has the same properties; it is a fine plant.

Aventaile (av'en-tâl), the movable face-guard of the helmet, through which the warrior breathed.

Aventurine (a-ven'tûr-in). See *Aventurine*.

Average (av'er-âj), in maritime law, any charge or expense over and above the freight of goods, and payable by their owner.—*General average* is the sum falling to be paid by the owners of ship, cargo, and freight, in proportion to their several interests, to make good

any loss or expense intentionally incurred for the general safety of ship and cargo; e.g., throwing goods overboard, cutting away masts, port dues in cases of distress, etc.—*Particular average* is the sum falling to be paid for unavoidable loss when the general safety is not in question, and therefore chargeable on the individual owner of the property lost. A policy of insurance generally covers both general and particular averages, less specially excepted.

Avernus (a-ver'nus), a lake, now called *Lago d'Averno*, in Campania, Italy, between the ancient Cumæ and Puteoli, about 8 m. from Naples. It occupies the crater of an old volcano, and is in some places 180 feet deep. Formerly the gloom of its forest surroundings and its mephitic exhalations caused it to be regarded as the entrance to the infernal regions. It was the fabled abode of the Cimmerians, and especially dedicated to Proserpine.

Averroes (a-ver'o-es; corrupted from *Ibn Roshd*), the most renowned Arabian philosopher, born at Cordova, in Spain, probably between 1120 and 1149. His ability procured him the succession to his father's office of chief magistrate, and the King of Morocco appointed him at the same time cadî in the province of Mauretania. Accused of being an infidel, he was, however, deprived of his offices, and banished to Spain; but, being persecuted there also, he fled to Fez, where he was condemned to recant and undergo public penance. Upon this he went back to his own country, where the Caliph Alman-sur finally restored him to his dignities. He died at Morocco, the year of his death being variously given as 1198, 1206, 1217, and 1225. Averroes regarded Aristotle as the greatest of all philosophers, and devoted himself so largely to the exposition of his works as to be called among the Arabians *The Interpreter*. He wrote a compendium of medicine, and treatises in theology, philosophy, jurisprudence, etc. His commentaries upon Aristotle appeared before 1250 in a Latin translation attributed to Michael Scott and others.

Averruncator (av-er-ung-kä'ter), a garden implement for pruning trees without a ladder, consisting of two blades similar to stout shears, one fixed rigidly to a long handle, and the other moved by a lever to which a cord passing over a pulley is attached.

Aversa (a-ver'sa), a well-built town of Southern Italy, 7 miles N. of Naples, in a beautiful vine and orange district, the seat of a bishop, with a

cathedral and various religious institutions, and an excellently-conducted lunatic asylum. Andreas of Hungary, husband of Queen Johanna I, was strangled in a convent here, Sept. 18, 1845. Pop. 23,477.

Avesnes (ä-vän), a town of France, dep. Nord. Pop. (1906) 5076.

Avesta (ä-vestä). See *Zendavesta*.

Aveyron (ä-vä-rôn), a department occupying the southern extremity of the central plateau of France, traversed by mountains belonging to the Cevennes and the Cantal ranges; principal rivers: Aveyron, Lot, and Tarn, the Lot alone being navigable. The climate is cold, and agriculture is in a backward state, but considerable attention is paid to sheep-breeding. It is noted for its 'Roquefort cheese.' It has important coal, iron, and copper mines, besides other minerals. Area, 3340 sq. miles; capital, Rhodéz. Pop. (1906) 377,299.

Avezzano (ä-vet-zä'nö), a town of Italy, prov. Aquila. Pop. 8400.

Aviary (ä'vi-ä-ri), a building or inclosure for keeping, breeding, and rearing birds. Aviaries appear to have been used by the Persians, Greeks, and Romans, and are highly prized in China. In England they were in use at least as early as 1577, when William Harrison refers to 'our costlie and curious aviaries.'

Aviation (ä'vi-ä-shun), the problem of flight as practised by birds and men. See *Aëroplane*.

Avicenna (ä-vi-sen'na) or **IBN-SINA**, an Arabian philosopher and physician, was born in Bokhara, A.D. 980. After practising as a physician he quitted Bokhara at the age of 22, and for a number of years led a wandering life, settling at last at Hamadan, latterly as vizier of the emir. On the death of his patron he lived in retirement at Hamadan, but having secretly offered his services to the Sultan of Ispahan, he was imprisoned by the new emir. Escaping, he fled to Ispahan, was received with great honor by the sultan, and passed there in quietness the last fourteen years of his life, writing upon medicine, logic, metaphysics, astronomy, and geometry. He died in 1037, leaving many writings, mostly commentaries on Aristotle. Of his 100 treatises the best known is the *Canon Medicinæ*, which was still in use as a text-book at Louvain and Montpellier in the middle of the seventeenth century.

Avienus (ä-vi-ä-nus), **RUFUS FESTUS**, a Latin descriptive poet,

who flourished about the end of the fourth century, after Christ, and wrote *Descriptio Orbis Terræ*, a general description of the earth; *Ora Maritima*, an account of the Mediterranean coasts, etc.

Avifauna (av-i-fa'na), a collective term for the birds of any region.

Avigliano (ä-vël-yä'nō), a town of S. Italy, prov. Potenza. Pop. 12,570.

Avignon (ä-vë-nyōn; ancient, *Aventio*), an old town of S. E. France, capital of department Vaucluse, on the left bank of the Rhone; inclosed by lofty battlemented and turreted walls, well built, but with rather narrow streets. It is an archbishop's see, and has a large and ancient cathedral on a rock overlooking the town, the immense palace in which the popes resided (now the property of the municipality). The industries of the city are numerous and varied, the principal being connected with silk. The silk manufacture and the rearing of silkworms are the principal employments in the district. Here Petrarch lived several years, and made the acquaintance of Laura, whose tomb is in the Franciscan church. From 1309 to 1376 seven popes in succession, from Clement V to Gregory XI, resided in this city. After its purchase by Pope Clement VI in 1348 Avignon and its district continued, with a few interruptions, under the rule of a vice-legat of the pope till 1791, when it was formally united to the French Republic. Pop. (1906) 35,356.

Avignon Berries. See *French Berries*.

Avila (ä've-lä), a town of Spain, capital of province of Avila, a modern division of Old Castile. See of the bishop suffragan of Santiago, with fine cathedral. Once one of the richest towns of Spain. Principal employment in the town, spinning; in the province, breeding sheep and cattle. Pop., town, 11,885; province, 200,457.

Avila, GIL GONZALEZ DE, a Spanish antiquary and biographer, 1577-1658; made historiographer of Castile in 1612, and of the Indies in 1641. Most valuable works: *Teatro de las Grandezas de Madrid*, 1623, and *Teatro Ecclesiastico*, 1645-53.

Avila y Zuniga (ä've-lä ä thö-nyë-gä), DON LUIS DE,

Spanish general, diplomatist, and historian; a favorite of Charles V; born about 1490; died after 1552. His chief work, translated into five or six languages, was on the war of Charles V in Germany.

Aviles (ä've'les), a town of Northern Spain, prov. Oviedo, with a good harbor. Pop. 12,768.

Aviz, an order of knighthood in Portugal, instituted by Sancho, its first king, and having as its original object the subjection of the Moors.

Avlona (äv-lö'nä), a seaport in Albania, seat of government of the principality. It was occupied by Italian forces during the European war (q. v.). Also called Valona. Pop. 6500.

Avocado (av-ö-ka'dō) pear. See *Alligator-pear*.

Avogadro's (äv-ö-gä'drö) LAW, in physics, asserts that equal volumes of different gases at the same pressure and temperature contain an equal number of molecules.

Avoirdupois (ä-vur-dü-pöiz; from old French, lit. 'goods of weight'), a system of weights used for all goods except precious metals, gems, and medicines, and in which a pound contains 16 ounces, or 7000 grains, while a pound troy contains 12 ounces, or 5760 grains. A hundredweight contains 112 pounds avoirdupois; a cental of 100 pounds is a legal British weight used at Liverpool and elsewhere in commerce.

Avola (äv'o-lä), a seaport on the east of Sicily, with a trade in almonds, sugar, etc. Pop. 16,235.

Avon (ä'von), the name of several rivers in England, of which the principal are: (1) The Upper Avon, rising in Northamptonshire, flowing s.w. into the Severn at Tewkesbury. Stratford-on-Avon lies on this river; (2) The Lower Avon, rising in Gloucestershire, and falling into the Severn n.w. of Bristol; navigable as far as Bath; (3) In Monmouthshire; (4) In Wiltshire and Hampshire, entering the English Channel at Christchurch Bay. There are also streams of this name in Wales and Scotland.

Avoset (äv'ö-set), a bird about the size of a lapwing, of the genus *Recurvirostra* (*R. avosetta*), family Scolopacidae (snipes), order Grallatores. The bill is long, slender, elastic, and bent upward toward the tip, the legs long, the feet webbed, and the plumage variegated with black and white. The bird feeds on worms and other small animals, which it scoops up from the mud of the marshes and fens that it frequents. It is found in Europe, Asia, Africa, and America; but the American species is slightly different from the other.

Avranches (ä-vränäh; *Abrincatæ*), a town of ancient France, department Manche, about 3 miles from the Atlantic. It formerly had a fine cathedral. Manufactures: lace, thread, and candles. Pop. (1906) 7186.

Awe (a), a Scottish lake in Argyshire, about 28 miles long by 2 broad, and communicating by the river Awe with Loch Etive. Ben Cruachan stands at its northern extremity. It has many islands and beautiful scenery, and abounds in trout, salmon, etc.

Axe, or **Ax**, a well-known tool for cutting or chipping wood, consisting of an iron head with an arched cutting edge of steel, which is in line with the wooden handle of the tool, and not at right angles to it as in the adze.

Axel. See **Absalon**.

Axe-stone, a mineral, a variety of nephrite or jade, used by the natives of New Zealand and South Pacific Islands for axes, etc. See **Jade**.

Axholme Isle (aks'om), a sort of island in England formed by the rivers Trent, Idle, and Don, in the northwest angle of Lincolnshire, 17 miles long, 4½ broad.

Axil, **AXILLA** (aks'il, aks-il'a), in botany, any, the angle between the upper side of a leaf and the stem or branch from which it springs. Buds usually appear in the axils, and flowers or flower-stalks growing in this way are called *axillary*.

Axillia, the space between the humerus and the chest below the shoulder joint, containing arteries, veins, brachial plexus of nerves and lymphatic glands. Outside the skin the surface is called the armpit.

Ax'im, a town of W. Africa, on the Gold Coast.

Axinite (aks'i-nit), a mineral, a silicate of alumina, lime, etc., with boron trioxide, deriving its name from the form of the crystals, the edges of which bear some resemblance to the edge of an axe.

Axinomancy (aks-in'o-man-si), an ancient method of divination by the movements of an axe (Gr. *axiné*) balanced on a stake, or of an agate placed on a red-hot axe. The names of suspected persons being uttered, the movements at a particular name indicated the criminal.

Axiom (aks'i-om), a universal proposition which the understanding must perceive to be true as soon as it perceives the meaning of the words, and therefore called a *self-evident truth*: e. g., *A is A*. In mathematics axioms are those propositions which are assumed without proof, as being in themselves independent of proof, and which are made the basis of all the subsequent reasoning; as. 'The whole is greater than its part';

'Things that are equal to the same thing are equal to one another.'

Axis (aks'is), the straight line, real or imaginary, passing through a body or magnitude, on which it revolves, or may be supposed to revolve; especially a straight line with regard to which the different parts of a magnitude, or several magnitudes, are symmetrically arranged; e. g., the *axis of the earth*, the imaginary line drawn through its two poles.

In botany the word is also used, the stem being termed the *ascending axis*, the root the *descending axis*.

In anatomy the name is given to the second vertebra from the head, that on which the *atlas* moves. See **Atlas**.

Axis (*Cervus axis*), a species of Indian deer, also known as the Spotted Hog-deer, of a rich fawn color, nearly black along the back, with white spots, and under parts white. Breeds freely in many parks in Europe.

Axis, Cerebro-spinal. The brain and spinal cord or central nervous system.

Axminster (aks'mins-tér), a market town, England, county Devon, on the Axe, at one time celebrated for its woollen cloth and carpet manufactures, and giving name to an expensive variety of carpet having a thick, soft pile, and also to a cheaper variety. Pop. (1911) 12,343.

Axolotl (aks'ò-lotl; *Amblystoma maculatum*), a curious Mexican amphibian, not unlike a newt, from 8 to 10 inches in length, with gills formed of three long ramified or branchlike processes floating on each side of the neck. It reproduces by laying eggs, and was for some time regarded as a perfect animal with permanent gills. It is said, however, that it frequently loses its gills like the other members of the genus, though some authorities maintain that the true axolotl never loses its gills, and that merely confusion with *A. tigrinum* has led to the belief, as this species sometimes retains its branchiae, though usually it loses them. The axolotl is esteemed a luxury by the Mexicans. There are a number of species of *Amblystoma* in N. America.

Ax'um, a town in Tigré, a division of an important kingdom, and at one time the great depot of the ivory trade in the Red Sea. The site of the town still exhibits many remains of its former greatness; but modern Axum is only a miserable village.

Ayacucho (ä-yä-k'ò'chò), the name of a department of Peru, and of its capital. The dept. has an area of

18,185 sq. miles. The town (formerly Guamanga or Huamanga) has a cathedral and a university, and a pop. of about 20,000.

Ayala (á-yá'la), PEDRO LOPEZ DE, Spanish historian and poet, chancellor of Castile in the second half of the fourteenth century, and the author of a history of Castile during 1350-98. He took an active part in the struggle between Henry II and Pedro the Cruel, and was taken prisoner by the English in 1367. During his English captivity he wrote part of his chief poetical work, a *Book in Rhyme concerning Court Life*. Died, 1407.

Ayamonte (í-a-mon'tá), a seaport town of Spain, province of Huelva, 2 miles from the mouth of the Guadiana. Pop. 7530.

Ayasaluk (á-yas'a-luk), the modern representative of ancient Ephesus.

Aye-aye (í-í), an animal of Madagascar (*Chiromys Madagascariensis*), so called from its cry, now referred to the lemur family. It is about the size of a hare, has large, flat ears and a bushy tail, large eyes; long, sprawling fingers, the third so slender as to appear shriveled, and used to pull larvae from crevices in trees; color, musk-brown mixed with black and gray ash; feeds on grubs, fruits, etc., habits, nocturnal.

Ayesha (a-yesh'a), daughter of Abubekr and favorite wife of Mohammed, the Arabian prophet, though she bore him no child; born in 610 or 611. After his death she opposed the succession of Ali, but was defeated and taken prisoner. She died at Medina in 677 or 678 (A.H. 58).

Aylesbury (áiz'be-ri), county town of Buckinghamshire, England, with a fine old parish church; chief industries, silk-throwing, printing, making condensed milk, and poultry-rearing for the London market. Previous to 1885 it and its hundred sent two members to parliament, and it still gives name to a parliamentary division. Pop. 11,048.

Ayloffe (á'lof), SIR JOSEPH, an English antiquary, born about 1708, died 1781; one of the first council of the Society of Antiquaries, a commissioner for the preservation of state papers, and author and editor of several works, of which the best known is his *Calendars of the Antient Charters*, etc.

Aymaras (í'má-ráz), an Indian race of Bolivia and Peru, speaking a language akin to the Quichua.

Aymen (á'mon), the surname of four brothers, Alard, Richard, Guiscard, and Renaud, who hold a first

place among the heroes of the Charlemagne cycle of romance. Their exploits were the subject of a romance, *Les Quatre Fils d'Aymon*, by Huon de Villeneuve, a trouvère of the thirteenth century, and Renaud is a leading figure in Ariosto's *Orlando*.

Ayr (ár), a town of Scotland, capital of Ayrshire, at the mouth of the river Ayr, near the Firth of Clyde. It was the site of a Roman station. William the Lion built a castle here in 1197 and constituted it a royal burgh in 1202; and the parliament which confirmed Edward Bruce's title to the crown sat in Ayr. It is picturesquely situated, and ranks among the better class of provincial towns, being chiefly of interest as the center of the 'Burns country.' One of its celebrated bridges, opened in 1879, occupies the place of the 'New Brig' of Burns's *Brigs of Ayr*, the 'Auld Brig' (built 1252) being still serviceable for foot traffic. Carpets and lace curtains are manufactured. The harbor accommodation is good, and there is a considerable shipping trade, especially in coal. The house in which Burns was born stands within 1½ miles of the town, between it and the church of Alloway ('Alloway's auld haunted kirk'), and a monument to him stands on a height between the kirk and the bridge over the Doon. Pop. 28,624.—The county has a length along the Firth of Clyde and North Channel of 80 miles; area 1128 sq. miles. The surface is irregular, and a large portion of it hilly, but much of it is fertile. The principal streams are the Ayr, Stinchar, Girvan, Doon, Irvine, and Garnock. Coal and iron are abundant; and there are numerous collieries and ironworks. Limestone and freestone abound. The Ayrshire cows are celebrated as milkers, and the Dunlop cheese has a good reputation. Oats, turnips, and potatoes are grown and dairying is a large industry. Carpets, bonnets, and worsted shawls are made, and Ayrshire needlework and wooden snuff-boxes and similar articles are much esteemed. Chief towns, Ayr, Kilmarnock, and Irvine. Pop. 254,400.

Ayrer (í'rer), JACOB, a German dramatist of the sixteenth century, who almost rivalled Hans Sachs in copiousness and importance. He was a citizen and legal official of Nuremberg, and died in 1605. His works, published at Nuremberg in 1618, under the title *Opus Theatricum*, include thirty comedies and tragedies and thirty-six humorous pieces.

Aytoun (á'tun), SIR ROBERT, poet, born in Fifeshire, Scotland, 1570, died 1638. After studying at St.

Andrews he lived for some time in France, whence, in 1603, he addressed a panegyric in Latin verse to King James on his accession to the crown of England. By the grateful monarch he was appointed one of the gentlemen of the bed-chamber, and private secretary to the queen, receiving also the honor of knighthood. At a later period of his life he was secretary to Henrietta Maria, queen of Charles I. His poems are few in number, but are distinguished by elegance of diction. Several of his Latin poems are preserved in the work called *Delicia Poetarum Scotorum*.

Aytoun, WILLIAM EDMONSTOUNE, poet and prose writer, born at Edinburgh in 1813; died at Blackhills, Elgin, 1865. He issued a volume of poems in 1832, by 1836 was a contributor to *Blackwood's Magazine*, and published the *Life and Times of Richard I* in 1840. In 1848 he published a collection of ballads entitled *Lays of the Scottish Cavaliers*, which has proved the most popular of all his works. It was followed in 1854 by *Firmilian, a Spasmodic Tragedy* (intended to ridicule certain popular writers); the *Bon Gaultier Ballads* (parodies and other humorous pieces, in conjunction with Theodore Martin), 1855; in 1856 the poem *Bothwell*; and in subsequent years by *Norman Sinclair*, *The Glenmutchkin Railway*, and other stories. In 1858 he edited a critical and annotated collection of the *Ballads of Scotland*. A translation of the poems and ballads of Goethe was executed by him in conjunction with Theodore Martin. In 1845 he became professor of rhetoric and English literature in the University of Edinburgh—a position which he held till his death.

Ayuntamiento (á-yun-tá-mē-en'tō), the name given to the town and village councils in Spain and Spanish America.

Ayuthia (a-yū'thē-a), the ancient capital of Siam, on the Menam, now a scene of splendid ruin.

Azalea (a-zā'lē-a), a genus of plants, natural order Ericaceæ, or heaths, remarkable for the beauty and fragrance of their flowers, and distinguished from the rhododendrons chiefly by the flowers having five stamens instead of ten. Many beautiful rhododendrons with deciduous leaves are known under the name of *azalea* in gardens. The azaleas are common in North America, and two species of these—*A. viscosa* and *A. nudiflora*—are well known in Britain. An Asiatic species, *A. pontica*, famous for the stupefying effect which its honey is said to have produced on Xenophon's



Azalea (Asalea indica).

army, is also common in British gardens and shrubberies; and another, *A. indica*, is a brilliant greenhouse plant.

Azamgarh (az'am-gar), a town of India, N. W. Provinces, capital of dist. of same name. Pop. about 20,000. The district has an area of 2147 sq. miles.

Azeglio (ád-zel'yō), MASSIMO TAPARELLI, MARQUIS D', an Italian 'admirable Crichton,' artist, novelist, publicist, statesman, and soldier, born at Turin in 1798, died 1866. After gaining some reputation in Rome as a painter, he married the daughter of Manzoni, and achieved success in literature by his novels *Ettore Fieramosca* (1833) and *Niccolo dei Lapi* (1841). These embodied much of the patriotic spirit, and in a short time he devoted himself exclusively to fostering the national sentiment by personal action and by his writings. Many of the reforms of Pius IX were due to him. He commanded a legion in the Italian struggle of 1848, and was severely wounded at Vicenza. Chosen a member of the Sardinian Chamber of Deputies, he was, after the battle of Novara, made president of the cabinet, and in 1859 appointed to the military post of general and commissioner-extraordinary for the Roman States.

Azerbaijan (á-zer-bi-jān'), a province of Northwestern Persia; area estimated at from 30,000 to 40,000 sq. miles; pop. estimated at about 1,500,000. It consists generally of lofty mountain ranges, some of which rise to a height of between 12,000 and 13,000 feet. Principal rivers; the Aras or Araxes, and the Kizil-Uzen, which enter the Caspian; smaller streams discharge themselves within the province into the great salt lake of Urumiyah. Agricultural products; wheat, barley, maize, fruit, cotton, tobacco, and grapes. Horses, cattle, sheep, and camels are reared in considerable numbers. Chief minerals: iron,

lead, copper, salt, saltpeter, and marble. Tabrees is the capital.

Azimurh (as'im-gur). See *Assur-gurh*.

Azimuth (as'i-muth), of a heavenly body, the arc of the horizon comprehended between the meridian of the observer and a vertical circle passing through the center of the body. The azimuth and altitude give the exact position of the body.

Azincourt (a-zan-kür). Same as *Agincourt*.

Azof (a'sof), a town in the Russian government of Ekaterinoslav, upon an island at the mouth of the Don, where it flows into the Sea of Azof; formerly a place of extensive trade, but its harbor has become almost sanded up. Pop. 27,000.

Azof, SEA OF (anc. *Pelus Mæotis*), an arm of the Black Sea, with which it is united by the Straits of Kertch or Kaffa; length about 170, breadth about 80 miles; greatest depth not more than 8 fathoms. The w. part, called the Putrid Sea, is separated from the main expanse by a long, sandy belt called Arabat, along which runs a military road. The sea teems with fish. The Don and other rivers enter it, and its waters are very fresh.

Azoic (a-zō'ik), 'without life,' a term applied to rocks devoid of fossils.

Azores (a-zōr' or a-zō'res), or WESTERN ISLANDS, a group belonging to and 900 miles west of Portugal, in the North Atlantic Ocean. They are nine in number, and form three distinct groups—a N. W., consisting of Flores and Corvo; a central, consisting of Terceira, São Jorge, Pico, Fayal, and Graciosa; and a S. E., consisting of São Miguel (or St. Michael) and Santa Maria. The total area is about 900 sq. miles; São Miguel (containing the capital Ponta Delgada), Pico and Terceira are the largest. The islands, which are volcanic and subject to earthquakes, are apparently of comparatively recent origin, and are conical, lofty, precipitous, and picturesque. The most remarkable summit is the peak of Pico, about 7600 feet high. There are numerous hot springs. They are covered with luxuriant vegetation, and diversified with woods, cornfields, vineyards, lemon and orange groves, and rich open pastures. The mild and somewhat humid climate, combined with the natural fertility of the soil, brings all kinds of vegetable products rapidly to perfection, among the most important being grain, oranges, pineapples, bananas, potatoes, yams, beans, coffee, and tobacco. The inhabitants are

mainly of Portuguese descent, indolent and devoid of enterprise. Principal exports: wine and brandy, oranges, maize, beans, pineapples, cattle. The climate is recommended as suitable for consumptive patients. The Azores were discovered by Cabral about 1481, shortly after which date they were taken possession of and colonized by the Portuguese. When first visited they were uninhabited, and had scarcely any other animals except birds, particularly hawks, to which, called in Portuguese *agores*, the islands owe their name. Pop. 250,474.

Azote (as'öt), a name formerly given to nitrogen; hence substances containing nitrogen and forming part of the structure of plants and animals are known as *azotized* bodies. Such are albumen, fibrin, casein, gelatin, urea, creatin, etc.

Azov. See *Asof*.

Azpeitia (ath-pä'i-ti-ä), a town of N. E. Spain, prov. Guipuscoa. Near it is the convent of Loyola, a large edifice, now a museum. Pop. 6068.

Azrael. See *Asrael*.

Aztecs (as'teks), a race of people who settled in Mexico early in the fourteenth century, ultimately extended their dominion over a large territory, and were still extending their supremacy at the time of the arrival of the Spaniards, by whom they were speedily subjugated. Their political organization, termed by the Spanish writers an absolute monarchy, appears to have consisted of a military chief exercising important, but not unlimited, power in civil affairs, in which the council of chiefs and periodic assemblies of the judges had also a voice. Their most celebrated ruler was Montezuma, who was reigning when the Spaniards arrived, about the middle of the fifteenth century. It is inferred that considerable numbers of them lived in large communal residences, and that land was held and cultivated upon the communal principle. Slavery and polygamy were both legitimate, but the children of slaves were regarded as free. Although not possessing the horse, ox, etc., they had a considerable knowledge of agriculture, maize and the agave being the chief produce. Silver, lead, tin, and copper were obtained from mines, and gold from the surface and river beds, but iron was unknown to them, their tools being of bronze and obsidian. In metal-work, feather-work, weaving, and pottery, they possessed a high degree of skill. To record events they used an unsolved hieroglyphic writing, and their lunar calendar

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were of unusual accuracy. Two special deities claimed their reverence: Huitzilopochtli, the god of war, propitiated with human sacrifices; and Quetzalcoatl, the beneficent god of light and air, with whom at first the Aztecs were disposed to identify Cortez. Their temples, with large terraced pyramidal bases, were in the charge of an exceedingly large priesthood, with whom lay the education of the young. As a civilization of apparently independent origin, yet closely resembling in many features the archaic oriental civilizations, the Aztec civilization is of the first interest, but in most accounts of it a large speculative element has to be discounted.

Azuline, Azurine (az'û-lîn, az'û-rîn), light-blue dyes derived from coal-tar.

Azure (az'ûr), the heraldic term for the color blue, represented in engraving by horizontal lines.

Azurine (az'û-rîn; *Leuciscus ceruleus*), a freshwater fish of the same genus as the roach, chub, and minnow, found in some parts of Europe, but rare in Britain; called also *Blue Roach*.

Azurite (az'û-rit), a blue mineral, a carbonate of copper, occurring in crystals which are rather brittle; called also *Blue Malachite*. Also a name of lazulite.

B

B is the second letter and the first consonant in the English and most other alphabets. It is a mute and labial, pronounced solely by the lips, and is distinguished from *p* by being sonant, that is, produced by the utterance of voice as distinguished from breath.

B, in music, the seventh note of the model diatonic scale or scale of C. It is called the leading note, as there is always a feeling of suspense when it is sounded until the keynote is heard.

Baader, FRANZ XAVER VON (frantz sã fer fon bl'der), German philosopher, and the greatest speculative Roman Catholic theologian of modern times; born in Munich, 1785, died 1841. He studied engineering, became superintendent of mines, and was ennobled for his services. He was deeply interested in the religious speculations of Eckhart, St. Martin, and Böhme, and in 1828 was appointed professor of philosophy and speculative theology in the University of Munich. During the last three years of his life he was interdicted from lecturing for opposing the interference in civil matters of the Roman Catholic Church.

Baal (bã'al), BEL, a Hebrew and general Semitic word, which originally appears to have been generic, signifying simply lord, and to have been applied to many different divinities, or, with qualifying epithets, to the same divinity regarded in different aspects and as exercising different functions. Thus in Hos., ii, 18, it is applied to Jehovah himself, while *Baal-berith* (the Covenant-lord) was the god of the Shechemites, and *Baal-zebub* (the Fly-god) the idol of the Philistines at Ekron. Baal was the sacred title applied to the Sun as the principal male deity of the Phœnicians and their descendants, the Carthaginians, as well as of the ancient Canaanitish nations, and was worshiped as the supreme ruler and vivifier of nature. The word enters into the composition of many Hebrew, Phœnician, and Carthaginian names of persons and places; thus, *Jerubbaal*, *Hasdrubal* (help of Baal), *Hannibal* (grace of Baal), and *Baal-Hammon*, *Baal-Thamer*, etc.

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Baalbek (bã'bek; ancient *Heliopolis*, city of the sun), a place in Syria, in a fertile valley at the foot of Antilibanus, 40 miles from Damascus, famous for its magnificent ruins. Of these the chief is the temple of the Sun, built either by Antoninus Pius or by Septimius Severus. Some of the blocks used in its construction are 60 ft. long by 12 thick; and its 54 columns, of which 6 are still standing, were 72 ft. high and 22 in circumference. Near it is a temple of Jupiter, of smaller size, though still larger than the Parthenon at Athens, and there are other structures of an elaborately ornate type. Originally a center of the Sun-worship, it became a Roman colony under Julius Cæsar; was garrisoned by Augustus, and acquired increasing renown under Trajan as the seat of an oracle. Under Constantine its temples became churches, but after being sacked by the Arabs in 748, and more completely pillaged by Timur (Tamerlane) in 1401, it sank into hopeless decay. The work of destruction was completed by an earthquake in 1750.

Baal-zebub. See *Beelzebub*.

Baba (bã'bã), a cape near the north-west point of Asia Minor.

Babadag (bã-bã-dãg'), a town of Roumania, capital of the Dobrudsha, carrying on a considerable Black Sea trade. Pop. about 3500.

Babbage (bab'aj), CHARLES, an English mathematician and the inventor of the calculating machine; born in 1792; died in 1871. He graduated at Cambridge in 1814, and was professor of mathematics for eleven years, but delivered no lectures. As early as 1812 he conceived the idea of calculating numerical tables by machinery, and in 1823 he received a grant from government for the construction of such a machine. After a series of experiments lasting eight years, and an expenditure of \$85,000 (\$30,000 of which was sunk by himself, the balance voted by government), Babbage abandoned the undertaking in favor of a much more enlarged work, an analytical engine, worked with

cards like the jacquard loom; but the project was never completed. The incomplete machine is now in the South Kensington Museum.

Babbitt Metal (bab'it met'al), a soft metal resulting from alloying together certain proportions of copper, tin, and zinc or antimony, used with the view of as far as possible obviating friction in the bearings of journals, cranks, axles, etc., invented by Isaac Babbitt (1799-1862), a goldsmith of Taunton, Massachusetts.

Babel, the same as *Babylon*.

Babel, **TOWNS** or, according to the 11th chapter of Genesis, a structure in the Plain of Shinar, Mesopotamia, commenced by the descendants of Noah subsequent to the deluge, but not completed. It has commonly been identified with the great temple of Belus or Bel that was one of the chief edifices in Babylon, and the huge mound called Birs Nimrud is generally regarded as its site, though another mound, which to this day bears the name of Babil, has been assigned by some as its site. Babel means literally 'gate of God.' The meaning 'confusion' assigned to it in the Bible really belongs to a word of similar form. See *Babylon*.

Bab-el-Mandeb ('gate of tears,' from being dangerous to small craft), a strait, 15 miles wide, between the Indian Ocean and the Red Sea, formed by projecting points of Arabia in Asia, and Abyssinia in Africa. The island of Perim is here.

Baber (ba'ber), the first Grand Mogul and the founder of the Mogul dynasty in Hindustan, born in 1483; died 1530. He was a grandson of the great Tartar prince Timur or Tamerlane, and was sovereign of Cabul. He several times invaded Hindustan, and in 1525 finally defeated and killed Sultan Ibrahim, the last Hindu emperor of the Patan or Afghan race. He made many improvements, social and political, in his empire, and left a valuable autobiography.

Babeuf (ba-beuf), **FRANÇOIS NOEL**, a personage connected with the French Revolution, born about 1764. He started a democratic journal at Paris, called *Le Tribun du Peuple, par Gracchus Babeuf*, which advocated communistic views, and wrote with great severity against the Jacobins. After the fall of Robespierre, to which he powerfully contributed, he openly attacked the terrorists, and advocated the most democratic principles. He was accused of a conspiracy against the directorial govern-

ment, condemned to death, and guillotined in 1797.

Babington, **ANTHONY**, a Catholic gentleman of Derbyshire, who was accused with others of his own persuasion of plotting to assassinate Queen Elizabeth, and deliver Mary, Queen of Scots. They were executed in 1586.

Babiroussa (ba-bi-rō'ssa). See *Babyroussa*.

Babism, (bi'bism) now **BAHAISM**, a religion founded in Persia, A.D. 1844. The founder, Mirza Ali Mohammed, was born at Shiraz in 1820, and as leader of the Shaykhi School was proclaimed the long-expected Bab, or Gate-way of Revelation. In 1844 he went to Mecca and declared himself the Forerunner of Imam-Mahdi, who had disappeared a thousand years previously. He was imprisoned, and while in prison worked out an entirely new system of philosophy. His disciples soon proclaimed him the complete Divine Manifestation, and began to explain away the outward forms of Moslem religion as symbols, putting many of their reforms into practice. Moslem officials oppressed the Babis, and the Bab was finally put to death. In 1863 Baha'u'llah succeeded to the leadership, and while in exile of over twenty years at Acre composed most of the sacred writings of the faith. Bahaism maintains that no revelation is final, and aims to unite people of all faiths without asking them to desert the religions with which they are affiliated. As practical reforms Bahaism urges the substitution of arbitration for war, woman suffrage, monogamic marriage, and a universal language. Upon the death of Baha'u'llah in 1892, his eldest son, Abdul Baha, became the acknowledged spiritual leader.

Baboo, or **BAHU**, a Hindu title of respect equivalent to *sir* or *master*, usually given to wealthy and educated native gentlemen; now often used as a word of contempt.

Baboon (ba-bōn'), the common name applied to a division of old-world quadrumana (apes and monkeys), comprehending the genera *Mandrilla* and *Papio*. They have elongated abrupt muzzles like a dog, strong tusks or canine teeth, usually short tails, cheek-pouches, small, deep eyes with large eyebrows, and naked callosities on the buttocks. Their hind and fore feet are well proportioned, so that they run easily on all fours, but they do not maintain themselves in an upright posture with facility. They are generally of the size of a moderately large dog, but the largest, the mandrill, is, when erect, nearly of the height of a man. They are almost all African, ugly, sullen.

ferce, lascivious, and gregarious, defending themselves by throwing stones, dirt, etc. They live on fruits and roots, eggs and insects. They include the chacma, drill, common baboon and mandrill. The chacma or pig-tailed baboon (*Cynocephalus porcarius*) is found in considerable numbers in parts of the S. African colonies, where the inhabitants wage war



Baboon (*Cynocephalus babouin*).

against them on account of the ravages they commit in the fields and gardens. The common baboon (*C. babouin*) inhabits a large part of Africa farther to the north. It is of a brownish-yellow color, while the chacma is grayish black, or in parts black. The hamadryas (*C. hamadryas*) of Abyssinia is characterized by long hair, forming a sort of shoulder cape. The black baboon (*C. niger*) is found in Culebes.

Babour (bā'bur). Same as *Baber*.

Babrius (bā'bri-us), a Greek poet who flourished during the second or third century of the Christian era, and wrote a number of Æsopian fables. Several versions of these made during the middle ages have come down to us as Æsop's fables. In 1840 a manuscript containing 120 fables by Babrius, previously unknown, was discovered on Mount Athos.

Babuyanes (bā-bu-yā'nes) ISLANDS, a group in the Pacific Ocean, between Luzon and Formosa, chiefly of volcanic origin. Pop. 8000.

Babylon (bab'l-on), the capital of Babylonia, on both sides of

the Euphrates, one of the largest and most splendid cities of the ancient world, now a scene of ruins, and earth-mounds containing them. Babylon was a royal city more than 3000 years before the Christian era; but the old city was almost entirely destroyed in 689 B.C. A new city was built by Nebuchadnezzar nearly a century later. This was in the form of a square, each side 15 miles long, with walls of such immense height and thickness as to constitute one of the wonders of the world. It contained splendid edifices, large gardens and pleasure-grounds, especially the 'hanging-gardens,' a sort of lofty, terraced structure supporting earth enough for trees to grow, and the celebrated tower of Babel or temple of Belus, rising by stages to the height of 625 ft. (See *Babel, Tower of*.) After the city was taken by Cyrus in 538 B.C., and Babylonia made a Persian province, it began to decline, and had suffered severely by the time of Alexander the Great. He intended to restore it, but was prevented by his death, which took place here in 323 B.C., from which time its decay was rapid. Interesting discoveries have been made on its site in recent times, more especially of numerous and valuable inscriptions in the cuneiform or arrow-head character. The modern town of Hillah is believed to represent the ancient city, and the plain here for miles round is studded with vast mounds of earth and brick and imposing ruins. The greatest mound is Birs Nimrud, about 6 miles from Hillah. It rises nearly 200 ft., is crowned by a ruined tower, and is commonly believed to be the remains of the ancient temple of Belus.

Babylon, Long Island, New York, a favorite summer resort: 37 miles east of Queens Borough. Pop. 9030.

Babylonia (now *Irak Arabi*), an old Asiatic empire occupying

the region watered by the lower course of the Euphrates and the Tigris, and by their combined stream. The inhabitants, though usually designated Babylonians, were sometimes called Chaldeans, and it is thought that the latter name represents a superior caste who at a comparatively late period gained influence in the country. At the earliest period of which we have record the whole valley of the Tigris and Euphrates was inhabited by tribes apparently of Turanian or Tartar origin. Along with these, however, there early existed an intrusive Semitic element, which gradually increased in number till at the time the Babylonians and Assyrians (the latter being a kindred people) became known to the western historians

they were essentially Semitic peoples. The great city Babylon (which see), or Babel, was the capital of Babylonia, which was called by the Hebrews Shinar. There seem originally to have been two sections; Accad, which lay to the north, and Shumer, which lay to the south, and the people are often called Accadians. There is some reason to believe that civilization began here 7000 or 8000 years before Christ, as estimated by Professor Hilprecht. If so, Babylonia may have been the earliest of civilized states, its only rival in antiquity being Egypt. The country was, as it still is, exceedingly fertile, and must have anciently supported a dense population. It was then widely irrigated, though the canals have long sunk into decay. The chief cities, besides Babylon, were Ur, Calneh, Erech, and Sippara. Babylonia and Assyria were often spoken of together as Assyria.

The discovery and interpretation of the cuneiform inscriptions have enabled the history of Babylonia to be carried back to at least 4000 B.C., at which period the inhabitants had attained a considerable degree of civilization, and the country was ruled by a number of kings or princes each in his own city. In later centuries single monarchs rose at times to the control of the whole country, and invaded the surrounding nations; the earliest and most famous of these being Sargon, about 3800 B.C. Several hundred years previous to 2000 B.C. Babylonia was conquered by and held subject to the neighboring Elam. It then regained its independence, and for nearly a thousand years it was the foremost state of Western Asia in power, as well as in science, art, civilization. The rise of the Assyrian Empire brought about the decline of Babylonia, which later was under Assyrian domination, though with intervals of independence. Tiglath-Pileser II of Assyria (745-727) made himself master of Babylonia; but the conquest of the country had to be repeated by his successor, Sargon, who expelled the Babylonian king, Merodach-Baladan, and all but finally subdued the country, the complete subjugation being effected by Sennacherib. After some sixty years a second Babylonian empire arose under Nabopolassar, who, joining the Medes against the Assyrians, freed Babylon from the superiority of the latter power, 625 B.C. The new empire was at its height of power and glory under Nabopolassar's son, Nebuchadnezzar (604-561), who subjected Jerusalem, Tyre, Phœnicia, and even Egypt, and carried his dominion to the shores of the

Mediterranean and northwards to the Armenian mountains. The capital, Babylon, was rebuilt by him, and then formed one of the greatest and most magnificent cities the world has ever seen. He was succeeded by his son Evil-Merodach, but the dynasty soon came to an end, the last king being Nabonidus, who came to the throne in B.C. 555, and made his son, Belshazzar, co-ruler with him. Babylon was taken by Cyrus the Persian monarch in 538, and the second Babylonian empire came to an end, Babylonia being incorporated in the Persian empire. Its subsequent history was similar to that of Assyria.

The account of the civilization, arts, and social advancement of the Assyrians already given in the article *Assyria* may be taken as generally applying also to the Babylonians, though certain differences existed between the two peoples. In Babylonia stone was not to be had, and consequently brick was the almost universal building material. Sculpture was thus less developed in Babylonia than in Assyria; and painting more. Babylonian art had also more of a religious character than that of Assyria, and the chief edifices found in ruins are temples. Weaving and pottery were carried to high perfection. Astronomy was cultivated from the earliest times. The Babylonians had a number of deities, but eventually the chief or national deity was Bel Merodach, originally the Sun-god. Education was well attended to, and there were schools and libraries in connection with the temples. The later Assyrian culture was based on that of Babylonia, which had been a nation of writers and students for many earlier centuries.

Babylonish CAPTIVITY, a term usually applied to the deportation of the two tribes of the kingdom of Judah to Babylon by Nebuchadnezzar, 588 B.C. The duration of this captivity is usually reckoned as seventy years, from the first deportation in 606 to Cyrus's proclamation in 536. A great part of the ten tribes of Israel had been previously taken captive to Assyria.

Babyroussa (bab-i-rus'a; a Malay word signifying stag-hog), a species of wild hog (*Sus* or *Porcus Babyroussa*), a native of the Indian Archipelago. From the outside of the upper jaw spring two teeth 12 inches long, curving upwards and backwards like horns, and almost touching the forehead. The tusks of the lower jaw also appear externally, though they are not so long as those of the upper jaw. Along the back are some weak bristles, and on

the rest of the body only a sort of wool. The skin of the babyrousa is comparatively smooth. The object of the upper tusks is not apparent, but it is supposed that the animal was accustomed to suspend himself to branches by means of these curved tusks. Another explanation offered is that ages ago they were straight, but were kept worn down by constant use.



Babyrousa (*Sus Babyrousa*)

Changed conditions have made them unnecessary and through disuse they have assumed distorted forms. It is a very dangerous animal and is able to inflict terrible wounds with the lower tusks.

Baccarat (bak'a-rat or bak-a-rá'), a gambling game of French origin, played by any number of players, or rather bettors, and a banker. The latter deals two cards to each player and two to himself, and covers the stakes of each with an equal sum. The cards are then examined, and according to the scores made the players take their own stake and the banker's or the latter takes all or a certain number of the stakes.

Bacchanalia, or **DIONYSIA** (bak-a-ná'li-a; di-ō-niz'i-a), feasts in honor of Bacchus or Dionysus, characterized by licentiousness and revelry, and celebrated in ancient Athens. In the processions were bands of Bacchanals of both sexes, who, inspired by real or feigned intoxication, wandered about rioting and dancing. They were clothed in fawn-skins, crowned with ivy, and bore in their hands *thyrsi*, that is, spears entwined with ivy, or having a pine-cone stuck on the point. These feasts passed from the Greeks to the Romans, who celebrated them with still greater dissoluteness till the senate abolished them B.C. 187.

Bacchante (bak-an'te), a woman taking part in revels in honor of Bacchus. See *Bacchanalia*.

Bacchiglione (bak-kil'yō-nā), a river of Northern Italy, which rises in the Alps, passes through the towns of Vicenza and Padua, and enters the Adriatic near Chioggia, after a course of about 90 miles.

Bacchus (bak'us; in Greek, generally named *Dionysos*), the god of wine, son of Zeus (Jupiter) and Semele. He first taught the cultivation

of the vine and the preparation of wine. To spread the knowledge of his invention he traveled over various countries and received in every quarter divine honors. Drawn by lions (some say panthers, tigers, or lynxes), he began his march, which resembled a triumphal procession. Those who opposed him were severely punished, but on those who received him hospitably he bestowed rewards. His love was shared by several; but Ariadne, whom he found deserted upon Naxos, alone was elevated to the dignity of a wife, and became a sharer of his immortality. In art he is represented with the round, soft, and graceful form of a maiden rather than with that of a young man. His long, waving hair is knitted behind in a knot, and wreathed with sprigs of ivy and vine leaves. He is usually naked; sometimes he has an ample mantle hung negligently round his shoulders; sometimes a fawn-skin hangs across his breast. He is often accompanied by Silenus, Bacchantes, Satyrs, etc. See *Bacchanalia*.

Bacchylides (bak-kil'i-dēs), born in the island of Ceos, about the middle of the 5th century B.C. the last of the great lyric poets of Greece, a nephew of Simonides and a contemporary of Pindar. Of his odes, hymns, poems, triumphal songs, only a few fragments remain.

Bacciocchi (bât-chok's), **MARIA ANNE ELIZA BONAPARTE**, sister of Napoleon, born at Ajaccio 1777, died near Trieste 1820; a great patroness of literature and art. She married Captain Bacciocchi, who in 1805 was created Prince of Lucca and Piombino. She virtually ruled these principalities herself, and as Grand-duchess of Tuscany she enacted the part of a queen. She fell with the empire.

Baccio Della Porta (bâch's), an Italian painter, better known under the name of *Fra Bartolommeo*, born near Florence 1475; died 1517. He studied painting in Florence, and acquired a more perfect knowledge of art from the works of Leonardo da Vinci. He was an admirer and follower of Savonarola, on whose death he took the Dominican habit, and assumed the name of *Fra Bartolommeo*. He was the friend of Michael Angelo and Raphael; painted many religious pictures, among them a *Saint Mark* and *Saint Sebastian*, which are greatly admired. His coloring, in vigor and brilliancy, comes near to that of Titian and Giorgione.

Bach (bâk), **JOHANN SEBASTIAN**, one of the greatest of German musicians, was born in 1685, at Eisenach;

died in 1750, at Leipzig. Being the son of a musician, he was early trained in the art, and soon distinguished himself. In 1703 he was engaged as a player at the court of Weimar, and subsequently he was musical director to the Duke of Anhalt-Köthen, and afterwards held an



Johann Sebastian Bach.

appointment at Leipzig. He paid a visit to Potsdam on the invitation of Frederick the Great. As a player on the harpsichord and organ he had no equal among his contemporaries; but it was not till a century after his death that his greatness as a composer was fully recognized. His compositions breathe an original inspiration, and are largely of the religious kind. They include pieces, vocal and instrumental, for the organ, piano, and stringed and keyed instruments; also church cantatas, oratorios, masses, passion music, etc. More than fifty musical performers have proceeded from his family. Sebastian himself had eleven sons, all distinguished as musicians. The most renowned were the following:—**WILHELM FRIEDEMANN**, born in 1710 at Weimar; died at Berlin in 1784. He was one of the most scientific harmonists and most skillful organists.—**KARL PHILIP EMMANUEL**, born in 1714 at Weimar; died in 1788 at Hamburg. He composed mainly for the piano, and published melodies for Gellert's hymns.

Bacharach (bā'ā-d-rā'), a small place of 1900 inhabitants on the Rhine, 12 miles s. of Coblenz. The vicinity produces excellent wine, which was once highly esteemed. The view from the ruins of the castle is one of the sublimest on the Rhine.

Bache (bāch), **ALEXANDER DALLAS**, a grandson of Benjamin Franklin, born in Philadelphia, 1806, and in

1825 a graduate of the U. S. Military Academy. Professor in the University of Pennsylvania 1828-36, and president of Girard College trustees 1836-42, he was afterwards superintendent of the United States coast survey. He died in 1807.

Bache, **FRANKLIN**, cousin of the preceding, born in Philadelphia in 1792, graduated at the University of Pennsylvania; professor of chemistry in Franklin Institute in 1820, in College of Pharmacy in 1831 and in Jefferson Medical College in 1841; president of the American Philosophical Society in 1853. Was one of the authors of Wood and Bache's *Dispensatory of the United States*. Died in 1864.

Bachian (bā-ché-an'), an island of the Dutch East Indies, in the Ternate group. It is mountainous and fertile, but inhabited only along the coast, having few people in the interior.

Bachelor (bach'e-lér), **IRVING**, journalist and author, born at Pierpoint, New York, in 1859; became one of the editors of the *New York World*. He is the author of numerous tales and poems, also the novels: *The Master of Silence*, *The Still House of O'Darrow*, *Eben Holden*, which had an enormous sale; also *D'ri and I*, and *Keeping up with Lissie*, a satire on American extravagance.

Bachelor (bach'e-lor), a term applied anciently to a person in the first or probationary stage of knighthood, who had not yet raised his standard in the field. It also denotes a person who has taken the first degree in the liberal arts and sciences or in divinity or law at a college or university, and in medicine in England and its colonies; or a man of any age who has not been married.—A *knight bachelor* is one who has been raised to the dignity of a knight without being made a member of any of the orders of chivalry, such as the Garter or the Thistle.

Bachelor's Buttons, the double-ter-cup (*Ranunculus acris*), with white or yellow blossoms, common in gardens.

Bacillaria (ba-sil-lā'ri-a), a genus of microscopic algae belonging to the class Diatomaceæ, the siliceous remains of which abound in cretaceous, tertiary, and more recent geological deposits.

Bacillus (ba-sil'us), the name applied to certain minute rod-like microscopic organisms (*Bacteria*) which often appear in putrefactions, and one of which is known to hold a constant causative relation to tubercle in the lung

and to be present in all cases of phthisis. Others are known to be connected with anthrax, typhoid fever, diphtheria, and other epidemic diseases. See *Bacteria*.

Back, ADMIRAL SIR GEORGE, an eminent English Arctic discoverer, born 1796, died 1878. He accompanied Franklin and Richardson in their northern expeditions, and in 1833-34 headed an expedition to the Arctic Ocean through the Hudson Bay Company's territory, on which occasion he wintered at the Great Slave Lake, and discovered the Back or Great Fish river. He contemplated proceeding along the coast to Cape Turnagain, but was hindered by the ice, and returned by the river. His expedition was undertaken primarily with the object of rescuing Captain Sir John Ross (q. v.), who was supposed to have been lost in his attempt to discover the Northwest Passage, but who, as a matter of fact, was able, after many hardships, to find his way out from the frozen circle and was picked up by the *Jeannette* in Aug., 1833. Sir George had learned of the return of Captain Ross, but continued his explorations and did not return to England till 1835. He was promoted in 1839, and attained flag rank in 1854; admiral, 1871.

Backergunge. See *Bacargunge*.

Backgammon (bak'gam-on), a game played by two persons upon a table or board made for the purpose, with pieces or men, dice-boxes, and dice. The table is in two parts, on which are twenty-four black and white spaces called points. Each player has fifteen men of different colors for the purpose of distinction. The movements of the men are made in accordance with the numbers turned up by the dice.

Backhuysen (bak'hoi-zn), LUDOLF, a celebrated painter of the Dutch school, particularly in sea pieces, born in 1631, died 1709. His most famous picture is a sea piece which the burgomasters of Amsterdam commissioned him to paint as a present to Louis XVI. It is still at Paris.

Bacninh (bak'nin), a town of Tonquin, on the Red River, fortified and containing a French garrison, being in an important strategic position. Pop. 7000.

Bacon (ba'kun), ANTHONY, elder brother to the celebrated lord-chancellor, was born in 1558 and died in 1601. He was an astute politician and much devoted to learned pursuits. He became personally acquainted with most of the foreign literati of the day, and gained the friendship of Henry IV of France. Lord Bacon dedicated to him the first edition of the *Essays*.

Bacon, FRANCIS, Baron of Verulam, Viscount St. Albans, and Lord High Chancellor of England; was born at London in 1561, died at Highgate in 1626. His father, Nicholas Bacon, was keeper of the great seal under Queen Elizabeth. (See *Bacon, Nicholas*.) He was educated at Trinity College, Cambridge, and in 1575 was admitted to Gray's Inn. In 1578-79 he was at Paris with Sir Amyas Paulet, English ambassador. The death of his father called him back to England, and being left in straitened circumstances, he zealously pursued the study of law, and was admitted a barrister in 1582. In 1584 he became member of parliament for Mel-



Lord Bacon.

combe Regis, and soon afterward drew up and addressed to Queen Elizabeth, an able political memoir. In 1586 he was member for Taunton, in 1589 for Liverpool. A year or two after he gained the Earl of Essex as a friend and patron. Unluckily he had displeased the queen, and when he applied for the solicitor-generalship (1595), he was unsuccessful. Essex endeavored to indemnify him by the donation of an estate in land. Bacon, however, forgot his obligations to his benefactor, and not only abandoned him as soon as he had fallen into disgrace, but without being obliged took part against him on his trial, in 1601, and was active in obtaining his conviction. He had been chosen member for the county of Middlesex in 1593, and for Southampton in 1597, but his affairs were not prospering. The reign of James

I was more favorable to his interest. He was assiduous in courting the king's favor, and James, who was ambitious of being considered a patron of letters, conferred upon him in 1603 the order of knighthood. In 1604 he was appointed king's counsel, with a pension of \$300; in 1606 he married; in 1607 he became solicitor-general, and six years after attorney-general. He was anxious to produce harmony between James and his parliament, but his efforts were without avail, and his obsequiousness and servility gained him enmity and discredit. In 1617 he was made lord-keeper of the seals; in 1618 Lord High Chancellor of England and Baron Verulam. His fame became increased by the publication, in 1620, of his most celebrated work, the famous *Novum Organum*. Soon after this his reputation received a fatal blow. A new parliament was formed in 1621, and the lord-chancellor was accused before the house of bribery, corruption, and other malpractices. It is difficult to ascertain the full extent of his guilt; but he seems to have been unable to justify himself, and handed in a 'confession and humble submission,' throwing himself on the mercy of the Peers. He was condemned to pay a fine of \$200,000, to be committed to the Tower during the pleasure of the king, declared incompetent to hold any office of state, and banished from court for ever. The sentence, however, was never carried out. The fine was remitted almost as soon as imposed, and he was imprisoned for only a few days. He survived his fall a few years, during this time occupying himself with his literary and scientific works, and vainly hoping for political employment. In 1597 he published his celebrated *Essays*, which immediately became very popular, were successively enlarged and extended, and translated into several of the European tongues. The treatise on the *Advancement of Learning* appeared in 1605; *The Wisdom of the Ancients* in 1609 (in Latin); his great philosophical work, the *Novum Organum* (in Latin), in 1620; and the *De Augmentis Scientiarum*, a much enlarged edition (in Latin) of the *Advancement*, in 1623. His *New Atlantis* was written about 1614-17; *Life of Henry VII* about 1621. Various minor productions also proceeded from his pen. Numerous editions of his works have been published, by far the best being that of Messrs. Spedding, Ellis, & Heath (1858-74). Bacon was great as a moralist, a historian, a writer on politics, and a rhetorician; but it is as the father of the inductive method in science, as the powerful exponent of the principle that

facts must be observed and collected before theorising, that he occupies the grand position he holds among the world's great ones. His moral character, however, was not on a level with his intellectual, self-aggrandizement being the main aim of his life. We need do no more than allude to the preposterous attempt that has been made to prove that Bacon was the real author of the plays attributed to Shakspeare, an attempt that only ignorance of Bacon and Shakspeare could uphold and tolerate.

Bacon, JOHN, an English sculptor, born 1740; died 1799. Among his chief works are two groups for the interior of the Royal Academy; the statue of Judge Blackstone for All Souls College, Oxford; another of Henry VI for Eton College; the monument of Lord Chatham in Westminster Abbey; and the statues of Dr. Johnson and Mr. Howard in St. Paul's Cathedral.

Bacon, SIR NICHOLAS, father of Lord Bacon, lord-keeper of the great seal, born 1510, died 1579. Henry VIII gave him several lucrative offices, which he retained under Edward VI. He lived in retirement during the reign of Mary, but Queen Elizabeth appointed him lord-keeper for life. He was the intimate friend of Lord Burleigh, a sister of whose wife he married, and by her became the father of the great chancellor.

Bacon, ROGER, an English monk, and one of the most profound and original thinkers of his day, was born about 1214, near Ilchester, Somersetshire; died at Oxford in 1294. He first entered the University of Oxford, and went afterwards to that of Paris, where he is said to have distinguished himself and received the degree of Doctor of Theology. About 1250 he returned to England, entered the order of Franciscans, and fixed his abode at Oxford, but having incurred the suspicion of his ecclesiastical superiors he was sent to Paris and kept in confinement for ten years, without writing materials, books, or instruments. The cause seems to have been simple enough. He had been a diligent student of the chemical, physical, and mathematical sciences, and had made discoveries, and deduced results, which appeared so extraordinary to the ignorant that they were believed to be works of magic. This opinion was countenanced by the jealousy and hatred of the monks of his fraternity. In subsequent times he was popularly classed among those who had been in league with Satan. Having been set at liberty he enjoyed a brief space of quiet while Clement IV was pope; but in 1278 he was again thrown into prison, where he re-

mained for at least ten years. Of the close of his life little is known. His most important work is his *Opus Majus*, where he discusses the relation of philosophy to religion, and then treats of language, metaphysics, optics, and experimental science. He was undoubtedly the earliest philosophical experimentalist in Britain; he made signal advances in optics; was an excellent chemist; but it was not he who discovered gunpowder, as has been stated, though he was probably familiar with its explosive property. He was intimately acquainted with geography and astronomy, as appears by his discovery of the errors of the calendar, and their causes, and by his proposals for correcting them, in which he approached very near the truth.

Bacon's Rebellion, an insurrection in Virginia in 1676, which arose from Indian depredations and the neglect of Sir William Berkeley, the governor, to send troops against them. A force of planters, led by Nathaniel Bacon, proceeded against them, and when proclaimed a traitor by Berkeley attacked him in Jamestown and burned the town. His sudden death left his followers to the vengeance of Berkeley, who executed a number of their leaders.

Bacteria (bak-tē'ri-a; Gr. *baktērion*, a rod), a class of very minute microscopical organisms, often of a rod-like form, which are regarded as of vegetable nature, and as being the cause of putrefaction; they are also called *microbes* or *microphytes*. The genus *Bacterium*, in a restricted sense, com-

animal and vegetable liquids. The bacilli (see *Bacillus*) are often spoken of as bacteria, this latter term being used in a wide sense and comprising organisms of various forms and with several distinct names, as *spirillum*, *micrococci*, etc. They consist of a mass of protoplasm enclosed in a membrane, and all have at some stage or other cilia serving for locomotion. Reproduction is asexual and by division. For their importance to man in regard to their connection with disease see *Germ Theory*.

Bactriana (bak-tri-ā'nā), or **BACTRIA**, a country of ancient Asia, south of the Oxus and reaching to the west of the Hindu Kush. It is often regarded as the original home of the Indo-European races. A Græco-Bactrian kingdom flourished about the third century B.C., but its history is obscure.

Bactris (bak'tris), a genus of American palms, the species generally small, one with a stem no thicker than a goose quill; some spiny and forming close thickets. The *Maraja* has edible fruit clusters like grapes and its stem is used for walking sticks.

Baculite (bak'ū-lit), a genus of fossil ammonites, characteristic of the chalk, having a straight tapering shell.

Bacup (bak'up), a municipal borough of England, in Lancashire, 18 miles N. of Manchester. The chief manufacturing establishments are connected with cotton-spinning and power-loom weaving; there are also iron-works, Turkey-red dyeing works, and in the neighborhood numerous coal-pits and immense stone quarries. Pop. 22,505.

Badagry (bā-dāg'rē), a British seaport on the Slave Coast, Upper Guinea, 50 miles E. N. E. of Whydah.

Badajoz (bā-dā-lōth'; anc. *Pax Augusta*), the fortified capital of the Spanish province of Badajoz, on the left bank of the Guadiana, which is crossed by a stone bridge of twenty-eight arches. It is a bishop's see, and has an interesting cathedral. During the Peninsular war Badajoz was besieged by Marshal Soult, and taken in March, 1811. It was retaken by Wellington on 6th April, 1812. Pop. 30,899.

Badakshan (bā-dak-shān'), a territory of Central Asia, tributary to the Ameer of Afghanistan. It has the Oxus on the north and the Hindu Kush on the south; and has lofty mountains and fertile valleys; the chief town is Faizabad. The inhabitants profess Mohammedanism. Pop. about 100,000.



Bacteria in Milk. (Greatly Enlarged.)

prises microscopical, unicellular, rod-shaped vegetable organisms, which multiply by transverse division of the cells. Species are found in all decomposing

Badalona (ba-dá-ló'ná), a Mediterranean seaport of Spain, 5 miles from Barcelona. Pop. 19,240.

Badderlocks (ba-d'er-loks), also called *Honeywars* or *Hemware*, an olive-colored sea-weed (*Alaria esculenta*). It is eaten by the coast people of Iceland, Denmark, Scotland, Ireland, etc., and is said to be the best of the esculent algae.

Baden (bá'dén), GRAND-DUCHY OF, one of the more important states of the German Empire, situated in the s. w. of Germany, to the west of Württemberg. It is divided into four districts, Constance, Freiburg, Carlsruhe, and Mannheim; has an area of 5824 sq. miles, and a pop. of 2,009,320. It is mountainous, being traversed to a considerable extent by the lofty plateau of the Schwarzwald or Black Forest, which attains its highest point in the Feldberg (4904 ft.). The nucleus of this plateau consists of gneiss and granite. In the north it sinks down towards the Odenwald, which is, however, of different geological structure, being composed for the most part of red sandstone. The whole of Baden, except a small portion in the s. e., in which the Danube takes its rise, belongs to the basin of the Rhine, which bounds it on the south and west. Numerous tributaries of the Rhine intersect it, the chief being the Neckar. Lakes are numerous, and its waters include a considerable part of the Lake of Constance. The climate varies much. The hilly parts, especially in the east, are cold and have a long winter, while the valley of the Rhine enjoys the finest climate of Germany. The principal minerals worked are coal, salt, iron, zinc, and nickel. The number of mineral springs is remarkably great, and of these not a few are of great celebrity. The vegetation is peculiarly rich, and there are magnificent forests. The cereals comprise wheat, oats, barley, and rye. Potatoes, hemp, tobacco, wine, and sugar-beet are largely produced. Several of the wines, both white and red, rank in the first class. Baden has long been famous for its fruits also. The farms are mostly quite small. The manufactures are important. Among them are textiles, tobacco and cigars, chemicals, machinery, pottery ware, jewelry (especially at Pforzheim), wooden clocks, confined chiefly to the districts of the Black Forest, musical boxes and other musical toys. The capital is Carlsruhe, about 5 miles from the Rhine; the other chief towns are Mannheim, Freiburg-im-Breisgau, with a Roman Catholic university; Baden, and Heidelberg. Baden has warm mineral springs, which were known and used in the time of the

Romans. Heidelberg has a university (Protestant), founded in 1386, the oldest in the present German Empire. The railways are a well-managed system, and are nearly all state property. In the time of the Roman Empire southern Baden belonged to the Roman province of Rhaetia. Under the old German Empire it was a margraviate, which in 1533 was divided into Baden-Baden and Baden-Durlach, but reunited in 1771. The title of grand-duke was conferred by Napoleon in 1806, and in the same year Baden was extended to its present limits. The executive power is vested in the grand-duke, the legislative in a house of legislature, consisting of an upper and a lower chamber. The former consists partly of hereditary members; the latter consists of elected representatives of the people. The revenue is mainly derived from taxes on land and incomes, and the produce of crown-lands, forests, and mines. Baden sends three members to the German Bundesrath or Federal Council, and fourteen deputies to the Diet. Nearly two-thirds of the population are Roman Catholics, the rest Protestants.

Baden (or *Baden-Baden*, to distinguish it from other towns of the same name; German *Bad*, a bath), a town and watering-place, Grand-duchy of Baden, 18 miles s. s. w. Carlsruhe, built in the form of an amphitheater on a spur of the Black Forest, overhanging a valley, through which runs a little stream, Oosbach. Baden has been celebrated from the remotest antiquity for its thermal baths; and it used also to be celebrated for its gaming saloons. It has many good buildings, and a castle, the summer residence of the grand-duke. Pop. (1915) 22,066.

Baden, a town of Austria, 15 miles s. w. of Vienna. It has numerous hot sulphurous springs, used both for bathing and drinking, and very much frequented. Pop. 17,770.

Baden, a small town of Switzerland, canton Aargau, celebrated for its hot sulphurous baths, which attract many visitors. Pop. 6109.

Baden-Powell, ROBERT S. S., soldier, born in England in 1857. He joined the Thirteenth Hussars in 1876, and served in India, Afghanistan, Ashanti, and South Africa. He held Mafeking against the Boer assault in 1899 and was made a major-general for his gallant defense. He wrote *The Matabela Campaign* and other works. He instituted the Boy Scouts organization (q. v.).

Badge (baj), a distinctive device, emblem, mark, honorary decora-

tion, or special cognizance, used originally to identify a knight or distinguish his followers, now worn as a sign of office or licensed employment, as a token of membership in some society, or generally as a mark showing the relation of the wearer to any person, occupation, or order.

Badger (baj'ér), a plantigrade, carnivorous mammal, allied both to the bears and to the weasels, of a clumsy make, with short, thick legs, and long claws on the forefeet. The common badger (*Meles vulgaris*) is as large as a middling-sized dog, but much lower on the legs, with a flatter and broader body, very thick, tough hide, and long, coarse hair. It inhabits the north of Europe and Asia, burrows, is indolent and sleepy, feeds by night on vegetables, small quadrupeds, etc. Its flesh may be eaten, and its hair is used for artists' brushes in painting. The American badger belongs to a separate genus. *Badger baiting*, or *drawing the badger*, is a barbarous sport, formerly and yet to some extent, practised, generally as an attraction to public-houses of the lowest sort. A badger is put in a barrel, and one or more dogs are put in to drag him out. When this is effected he is returned to his barrel, to be similarly assailed by a fresh set. The badger usually makes a most determined and savage resistance.

Badger Dog, a long-bodied, short-legged dog, with rather large, pendulous ears, usually short haired, black, and with yellow extremities; often called by its German name *Dackshund*.

Bad Lands, an extensive region in South Dakota, extending into Nebraska, so called from the French title *Mauvaises terres*. It is a hilly region of friable material which has been cut by rivers and streams into innumerable ravines, the worn hill faces often looking like massive works of architecture. The Sioux Indians formerly used these hills as a natural fortress, and more recently they have proved rich in fossil remains of ancient animals.

Badminton (bad'min-tun), an outdoor game closely resembling lawn-tennis, but played with battledore and shuttlecock instead of ball and racket; named after a seat of the Duke of Beaufort, in Gloucestershire.

Badrinath (ba-dri-nāt'), a peak of the main Himalayan range, in Garhwal District, Northwestern Provinces, 23,210 feet above the sea. On one of its shoulders at an elevation of 10,400 feet stands a celebrated temple of Vishnu, which some years attracts as many as 50,000 pilgrims.

Baedeker (bā'de-kér), KARL, a German publisher, born 1801, died 1859; originator of a celebrated series of guide-books for travelers.

Baena (bā-ā'ná), a town of Spain, in Andalusia, province of and 24 miles S. S. E. from Córdoba. Pop. 14,580.

Baena (bā-ā'thā; anciently, *Beatie*), a town of Spain, in Andalusia, 22 miles E. N. E. from Jaen, with 14,379 inhabitants. The principal edifices are the cathedral, the university (now suppressed), and the old monastery of St. Philip de Neri.

Baffa (bā'fā; anc. *Paphos*), a seaport on the S. W. coast of Cyprus. It occupies the site of New Paphos, which, under the Romans, was full of beautiful temples and other public buildings. Old Paphos stood a little to the southeast.

Baffin (bā'fin), WILLIAM, an English navigator, born 1584; famous for his discoveries in the Arctic regions; in 1616 ascertained the limits of Baffin Bay; was killed at the siege of Ormus, in the East Indies, in 1622.

Baffin Bay, on the N. E. of North America between Greenland and the islands that lie on the N. of the continent; discovered by Baffin in 1616.

Bagasse (ba-gas'), the sugar-cane in its dry crushed state as delivered from the mill, and after the main portion of its juice has been expressed; used as fuel in the sugar factory, and called also *cane-trash*.

Bagatelle (bag-a-tel'), a game played on a long, flat board covered with cloth like a billiard-table, with spherical balls and a cue or mace. At the end of the board are nine cups or sockets of just sufficient size to receive the balls. There are several varieties of the game, the score in all being decided by the greatest number of balls holed.

Bagdad (bāg-dād' or bag'dad), capital of a Turkish pashalic of the same name (54,540 sq. miles, 500,000 to 1,000,000 inhabitants), in the southern part of Mesopotamia (now *Irak Arabi*). The greater part of it lies on the eastern bank of the Tigris, which is crossed by a bridge of boats; old Bagdad, the residence of the caliphs (now in ruins), was on the western bank of the river. The modern city is surrounded with a brick wall about 6 miles in circuit; the houses are mostly built of brick, the streets unpaved and very narrow. The palace of the governor is spacious. Of the mosques, only a few attract notice; the bazaars are all large and well stocked; among their number are found some

Bagdoh.

of the most splendid in the world. Manufactures: leather, silks, cottons, woollens, carpets, etc. Steamers ply on the river between Bagdad and Bassorah, and the town exports wheat, dates, galls, gum, mohair, carpets, etc., to Europe. Bagdad is inhabited by Turks, Arabs, Persians, Armenians, Jews, etc., and a small number of Europeans. Estimated pop. over 225,000. The Turks compose three-fourths of the whole population. The

Bagnères de Bigorre

Baggesen (bāg'e-sen), JENS, a Danish poet, who also wrote much in German; born 1764, at Korsør; died at Hamburg, 1828. He tried lyric, epic, dramatic poetry, and both serious and humorous verse. His best productions are his smaller poems and songs, several of which are very popular with his countrymen.

Baghelkhand (bā-gel-kānd'), a tract of country in Central



Bagdad, from the South.

city has been frequently visited by the plague, and in 1831 was nearly devastated by that calamity. Bagdad was founded in 762, by the Caliph Almansur, and raised to a high degree of splendor in the ninth century by Harun Al Rashid. It is the scene of a number of the tales of the 'Arabian Nights.' In the thirteenth century it was stormed by Hulaku, grandson of Genghis-Khan. It was captured from the Turks by a British army in 1917, during the European war.

Bagshot (bāj'ot), WALTER, an English economist and journalist, born at Langport, Somerset, in 1828; died at the same place in 1877. He graduated at the London University, 1848, and was for some time associated with his father in the banking business in London. He was one of the editors of the *National Review* (1855-64), and from 1860 till his death he was editor and part proprietor of the *Economist*. His chief works are: *Physics and Politics*, *The English Constitution*, *Lombard Street*, and *Studies, Literary, Biographic, and Economic*.

Baggala (bāg'a-la), a two-masted Arab boat, generally 200-250 tons burden, used for trading in the Indian Ocean, Red Sea, etc.

India, occupied by a collection of native states (Rewah being the chief), under the governor-general's agent for Central India.

Bagheria (bā-gā-rē'ā), a town of Sicily, 7 miles east of Palermo. Pop. 17,200.

Bagirmi (bā-gir'mē), or BAGHERMI, a Mohammedan negro state in Central Africa, situated between Bornu and Waday, to the south of Lake Tchad. It is mostly a plain; has an area of about 58,000 sq. miles, and about 1,500,000 inhabitants. The people are industrious, and have attained a considerable degree of civilization.

Bagnacavallo (bān-yā-kā-vā'l'ō), BARTOLOMMEO RAMENGHI, Italian painter, born in 1484; died in 1542. Called Bagnacavallo from the village where he was born. At Rome he was a pupil of Raphael, and assisted in decorating the gallery of the Vatican.

Bagnara (bā-nyā'rā), a seaport near the s. w. extremity of Italy. Pop. 7568.

Bagnères de Bigorre (bān-yār dé bē-gorr), a watering-place in France, department of Hautes Pyrénées, on the left bank of the Adour. It owes celebrity to its baths,

which are sulphurous and saline, but it has also manufacturing and other industries. Pop. (1908) 6061.

Bagnères de Luchon (bân-yâr dé lû-shôn), a town in France, department Haute Garonne, in a valley surrounded by wooded hills, one of the principal watering-places of the Pyrenees, having sulphurous thermal waters, said to be beneficial in rheumatic complaints. Resident pop. 8200.

Bagpipe (bag'pîp), a musical wind-instrument of very great antiquity, having been used among the ancient Greeks, and being a favorite instrument over Europe generally in the fifteenth century. It still continues in use among the country people of Poland, Italy, the south of France, and in Scotland and Ireland. Though now often regarded as the national instrument of Scotland, especially Celtic Scotland, it is only Scottish by adoption, having been introduced into that country from England. It consists of a leathern bag, which receives the air from the mouth, or from bellows; and of pipes, into which the air is pressed from the bag by the performer's elbow. In the common or Highland form one pipe (called the *chanter*) plays the melody; of the three others (called *drones*) two are in unison with the lowest A of the chanter, and the third and longest an octave lower, the sound being produced by means of reeds. The chanter has eight holes, which the performer stops and opens at pleasure, but the scale is imperfect and the tone harsh. There are several species of bagpipes, as the soft and melodious Irish bagpipe, supplied with wind by a bellows, and having several keyed drones; the old English bagpipe (now no longer used); the Italian bagpipe, a very rude instrument, etc.

Bagration (bâg-râ'tyôn), PETER, PRINCE, a distinguished Russian general, descended from a noble Georgian family. He was born in 1765, entered the Russian service in 1783, and was constantly engaged in active service till he was mortally wounded at the battle of Borodino, Sept. 7, 1812.

Bagshot Sand, in geology the collective name for a series of beds of siliceous sand, occupying extensive tracts round Bagshot, in Surrey, and in the New Forest, Hampshire, the whole reposing on the London clay; generally devoid of fossils.

Ba'haism, the modern development of Babism. See *Babism*.

Bahama (ba-hâ'ma) ISLANDS, or LUCAYOS (lô-k'ios), a group of

islands in the West Indies, forming a colony belonging to Britain, lying N. E. of Cuba and S. E. of the coast of Florida, the gulf stream passing between them and the mainland. They extend a distance of upwards of 600 miles, and are said to be twenty-nine in number, besides keys and rocks innumerable. The principal islands are Grand Bahama, Great and Little Abaco, Andros Islands, New Providence, Eleuthera, San Salvador, Great Exuma, Watling Island, Long Island, Crooked Island, Acklin Island, Mariguana Island, Great Inagua. Of the whole group, about twenty are inhabited, the most populous being New Providence, which contains the capital, Nassau, the largest being Andros, 100 miles long, 20 to 40 broad. They are low and flat, and have in many parts extensive forests. Total area, 5450 sq. miles. The soil is a thin but rich vegetable mold, and the principal product is pineapples, which form the most important export. Other fruits are also grown, with cotton, sugar, maize, yams, ground-nuts, cocoa-nuts, etc. Sponges are obtained in large quantity and are exported. The islands are a favorite winter resort for those afflicted with pulmonary diseases. Watling Island is now by best authorities believed to be same as Guanahani, the land first touched on by Columbus (October 12, 1492), on his first great voyage of discovery. The first British settlement was made on New Providence towards the close of the seventeenth century. A number of Americans loyal to England settled in the islands after the war of independence. Pop. 53,735, largely negroes.

Bahar (ba-hâr'), or BARRE, an East Indian measure of weight, varying considerably in different localities and in accordance with the substances weighed, the range being from 223 to 625 lbs.

Bahawalpur (bâ-hâ-whal-pur'), a town of India, capital of state of same name in the Punjab, 2 miles from the Sutlej; surrounded by a mud wall and containing the extensive palace of the Nawab. Pop. (1911) 18,546. The state has an area of 15,000 sq. miles, of which 10,000 is desert, the only cultivated lands lying along the Indus and Sutlej. Pop. 720,700.

Bahia (bâ-ê'a; formerly *San Salvador*), a town of Brazil, on the Bay of All Saints, province of Bahia. It consists of a lower town, which is little more than an irregular, narrow, and dirty street, stretching about 4 miles along the shore; and an upper town, with which it is connected by a steep street, much

better built. The harbor is one of the best in South America; and the trade, chiefly in sugar, cotton, coffee, tobacco, hides, piassava, and tapioca, is very extensive. Pop. about 290,000. The State



of Bahia, area, 164,649 square miles, pop. in 1888, 1,919,802, has much fertile land, both along the coast and in the interior.

Bahr (bär), an Arabic word signifying sea or large river; as in Bahr-el-Huleh, the Lake Merom in Palestine; Bahr-el-Abiad, the White Nile, Bahr-el-Azrek, the Blue Nile, which together unite at Khartoum.

Bahraich (bā-rīch'), a flourishing town of India, in Oudh, a place of great antiquity. Pop. about 25,000.

Bahrein (bā-rān') ISLANDS, a group of islands in the Persian Gulf, in an indentation on the Arabian coast. The principal island, usually called Bahrein, is about 27 miles in length and 10 in breadth. The principal town is Manameh or Manama; pop. about 25,000. The Bahrein Islands are chiefly noted for their pearl-fisheries, which were known to the ancients.

Bahr-el-Ghazal (bāh-el-gā-zāl'), a large river of Central Africa, a western tributary of the White Nile.

Baiadeer. See *Bayadere*.

Baiæ (bā'ē), an ancient Roman watering-place on the coast of Campania, 10 miles west of Naples. Many of the wealthy Romans had country houses at Baiæ, which Horace preferred to all other places. Ruins of temples, baths, and villas still attract the attention of archaeologists.

Baikal (b'kāl), a large fresh-water lake in Eastern Siberia, 360 miles long, and about 50 in extreme breadth, interspersed with islands; lon. 104° to 110° E.; lat. 51° 20' to 55° 20' N. It is surrounded by rugged and lofty mountains; contains seals, and many fish, particularly salmon, sturgeon, and pike. Its greatest depth is over 4000 feet. It receives the waters of the Upper Angara, Selenga, Barguzin, etc., and discharges its waters by the Lower Angara. It is frozen over in winter.

Baikie (bā'ke), WILLIAM BALFOUR, born in the Orkney Islands 1824, died at Sierra Leone 1864. He joined the British navy, and was made surgeon and naturalist of the Niger expedition, 1854. He took the command on the death of the senior officer, and explored the Niger for 250 miles. Another expedition, which started in 1857, passed two years in exploring, when the vessel was wrecked, and all the members, with the exception of Baikie, returned to England. With none but native assistants he formed a settlement at the confluence of the Benue and the Niger, in which he was ruler, teacher, and physician, and within a few years he opened the Niger to navigation, made roads, established a market, etc.

Bail (bāl), the person or persons who procure the release of a prisoner from custody by becoming surety for his appearance in court at the proper time; also, the security given for the release of a prisoner from custody.

Bailen (bā-len'), a town of Spain, prov. Jaen, with lead mines. Pop. 7420.

Bailey (bā'il), the name given to the courts of a castle formed by the spaces between the circuits of walls or defenses which surrounded the keep.

Bailey, LIBERTY H., an American botanist, born in 1858, professor of horticulture at Michigan Agricultural College in 1885, at Cornell 1888, director of College of Agriculture there in 1903. Edited *Cyclopedia of American Horticulture*, *Rural Science*, *Rural Text-Book* series, *Cyclopedia of Agriculture*, etc. Author of *The Survival of the Unlike*, *Evolution of Our Native Fruits*, etc.

Bailey, or BAILY, NATHANIEL, an English fish lexicographer, a school teacher at Stepney, and author of several educational works. His dictionary, published in 1721, passed through a great many editions.

Bailey, PHILIP JAMES, an English poet, born at Nottingham, in 1816, and called to the bar in 1840. Published *Festus*, his best work, in 1839; *The Mystic*, 1855; *The Age*, 1858; and

The Universal Hymn, 1867. He died in 1902.

Bailie, Baillie (bā'il), a municipal officer or magistrate in Scotland, corresponding to an *alderman* in England. The criminal jurisdiction of the provost and bailies of royal burghs extends to breaches of the peace, drunkenness, adulteration of articles of diet, thefts not of an aggravated character, and other offenses of a less serious nature.

Bailiff (bā'if), a civil officer or functionary, subordinate to some one else. There are several kinds of bailiffs, whose offices widely differ, but all agree in this, that the keeping or protection of something belongs to them. In England the sheriff is the monarch's bailiff, and his county is a bailiwick. The name is also applied to the chief magistrates of some towns, to keepers of royal castles, as of Dover, to persons having the conservation of the peace in hundreds and in some special jurisdictions, as Westminster, and to the returning-officers in the same. But the officials commonly designated by this name are the *bailiffs* of sheriffs, or sheriffs' officers, who execute processes, etc. *Bailiwick* represents the limits of a bailiff's authority.

Bailleul (bā-yeul), an ancient French town, department of Nord, near the Belgian frontier, about 10 miles west of Lille. Has manufactures of woolen and cotton stuffs, lace, leather, etc. Pop. 11,900. A village of same name in dep. Orne gave its name to the Bailiol family.

Baillie (bā'is), JOANNA, a Scottish authoress, born at Bothwell, Lanarkshire, in 1762; died at Hampstead in 1861. She removed in early life to London, where in 1798 she published her first work, entitled *A Series of Plays*, in which she attempted to delineate the stronger passions by making each passion the subject of a tragedy and a comedy. Other volumes followed and also a volume of miscellaneous poetry, including songs. Her only plays performed on the stage were a tragedy entitled the *Family Legend*, brought out at Edinburgh under the patronage of Sir Walter Scott; and *De Montfort*, brought out by John Kemble.

Baillie, MATTHEW, physician and anatomist, brother of the preceding, was born in 1761 at Shotts, Lanarkshire; died at Cirencester, Gloucestershire, in 1828. In 1773 he was placed at the University of Glasgow. He afterwards studied anatomy under his maternal uncles John and William Hunter, and entered Oxford, where he was graduated as

M.D. In 1783 he succeeded his uncle as lecturer on anatomy in London, where he acquired a high reputation as a teacher and demonstrator, having also a large practice. In 1810 he was appointed physician to George III. His work on *The Morbid Anatomy of Some of the Most Important Parts of the Human Body* gave him a European reputation.

Baillie, ROBERT, an eminent Scottish Presbyterian clergyman, was born at Glasgow in 1809; died in 1862. Though educated and ordained as an Episcopalian, he resisted the attempt of Archbishop Laud to introduce his Book of Common Prayer into Scotland and joined the Presbyterian party, and in 1840 he was selected to go to London, with other commissioners, to prepare charges against Archbishop Laud for his innovations upon the Scottish Church, and was subsequently appointed professor of divinity at Glasgow. He was a man of profound learning, wrote a number of theological works, and his letters and journal are of great value for the history of his time.

Baillie, ROBERT, of Jerviswood, in Lanarkshire, a Scottish patriot of the reign of Charles II. In 1683 he went to London in furtherance of a scheme of emigration to South Carolina as being the only way of escaping the tyranny of the government. He became associated with Monmouth, Sydney, Russell, and the rest of that party, and was charged with complicity in the Rye-house plot. He was condemned without evidence and executed in December, 1684.

Bailly (bā-ye), JEAN SYLVAIN, French astronomer and statesman, born at Paris, in 1738. After some youthful essays in verse, he was induced by Lacaille to devote himself to astronomy, and on the death of the latter in 1753, being admitted to the Academy of Sciences, he published a reduction of Lacaille's observations on the zodiacal stars. In 1764 he competed ably but unsuccessfully for the Academy prize offered for an essay upon Jupiter's satellites. Lagrange being his opponent; and in 1771 he published a treatise on the light reflected by these satellites. In the meantime he had won distinction as a man of letters by his eulogiums on Pierre Corneille, Leibnitz, Molière, and others; and the same qualities of style shown by these were maintained in his *History of Astronomy* (1775-87), his most extensive work. In 1784 the French Academy elected him a member. The revolution drew him into public life. Paris chose him, May 12, 1789, first deputy of the *tiers-état*, and in the assembly itself he

was made first president, a post occupied by him on June 20, 1789, in the session of the Tennis Court, when the deputies swore never to separate till they had given France a new constitution. As



Jean Sylvain Bailly

mayor of Paris his moderation and impartial enforcement of the law failed to commend themselves to the people, and his forcible suppression of mob violence, July 17, 1791, aroused a storm which led to his resignation and retreat to Nantes. In 1793 he attempted to join Laplace at Melun, but was recognized and sent to Paris, where he was condemned by the revolutionary tribunal, and executed on November 12.

Bailment (bā'l'ment), in law, is the delivery of a chattel or thing to a person in trust, either for the use of the bailor or person delivering, or for that of the bailee or person to whom it is delivered. A bailment always supposes the subject to be delivered only for a limited time, at the expiration of which it must be redelivered to the bailor, the responsibility of the bailee being dependent, in some degree, upon the contract on which the bailment is made. Pledging and letting for hire are species of bailment.

Baily (bā'ly), EDWARD HODGES, an English sculptor, born at Bristol about 1788; died in 1867. He studied under Flaxman and at the Royal Academy, where he won the gold and silver medals. His best works include *Eve at the Fountain*, *Psyche*, *Heracles Casting Lions into the Sea*, etc., with statues of Lord Mansfield, Nelson, and other men of note.

Baily, FRANCIS, astronomer, born in London as a stockbroker in 1802. While

thus actively engaged he published *Tables for the Purchasing and Renewing of Leases*, the *Doctrine of Interest and Annuities*, the *Doctrine of Life Annuities and Assurances*, and an epitome of universal history. On retiring from business with an ample fortune in 1825 he turned his attention to astronomy, became one of the founders of the Astronomical Society, contributed to its *Transactions*, and in 1835 published a life of Flamsteed. He died in 1844.

Baily's Beads, a phenomenon attending eclipses of the sun, the unobscured edge of which appears discontinuous and broken immediately before and after the moment of complete obscuration. It is classed as an effect of irradiation.

Bain (bān), ALEXANDER, writer on mental philosophy and education, was born at Aberdeen in 1818. He was educated at Marischal College, Aberdeen, and after holding minor positions in 1860 was appointed professor of logic and English in Aberdeen University, a post which he held till his resignation in 1881. His most important works are: *The Senses and the Intellect*, *the Emotions and the Will*, together forming a complete exposition of the human mind; *Mental and Moral Science*; *Logic, Deductive and Inductive*; *Mind and Body*; *Education as a Science*; *James Mill, a Biography*; *John Stuart Mill*, besides an *English Grammar*, *Manual of English Composition and Rhetoric*, etc. He died in 1903.

Bainbridge (bān'brīj), WILLIAM, an American naval officer, was born at Princeton, New Jersey, in 1774, entered the navy, in 1798, served with distinction against France that year and next; in 1800, as captain, carried tribute to Algiers, where he was humiliated by the dey, and in 1804 he was taken prisoner by the Tripolitans. He served with marked success in the war of 1812. In 1815 he commanded a squadron against Algiers. In 1824-7 he was a member of the Board of Navy Commissioners in Washington. He died in 1833.

Bairam (bā'ram), the Easter of the Mohammedans, which follows immediately after the Ramadan or Lent (a month of fasting), and lasts three days. This feast during the course of thirty-three years makes a complete circuit of all the months and seasons, as the Turks reckon by lunar years. Sixty days after this first great Bairam begins the lesser Bairam. They are the only two feasts prescribed by the Mohammedan religion.

Baird (bārd), SIR DAVID, a distinguished British commander, was born in Edinburghshire in 1757, and entered the

army in 1772. Having been promoted to a lieutenancy in 1778, he sailed for India, distinguished himself as a captain in the war against Hyder Ali, was wounded and taken prisoner, and confined in the fortresses of Seringapatam for nearly four years. He and his fellow-prisoners were treated with great barbarity, and many of them died or were put to death, but at last (in 1784) all that survived were set at liberty. Made a major in 1787 and lieutenant colonel in 1791, he commanded a brigade under Cornwallis in the war against Tippoo. Appointed major-general in 1798, he returned to India. In 1799 he commanded the storming party at the assault of Seringapatam, and, in requital, was presented with the state sword of Tippoo Saib. Being appointed in 1800 to command an expedition to Egypt, he landed at Kosseir in June,



Sir David Baird.

1801, crossed the desert, and, embarking on the Nile, descended to Cairo, and thence to Alexandria, which he reached a few days before it surrendered to General Hutchinson. Next year he returned to India, but being soon after superseded by Sir Arthur Wellesley (Wellington), he sailed for Britain, where he was knighted and made K.C.B. With the rank of lieutenant-general he commanded an expedition in 1805 to the Cape of Good Hope, and in 1806, after defeating the Dutch, he received the surrender of the colony. He commanded a division at the siege of Copenhagen, and after a short period of service in Ireland sailed with 10,000 men for Corunna, where he formed a junction with Sir John Moore. He commanded the first division of Moore's army, and in the battle of Corunna lost his left arm. By the death of Sir John Moore Sir David succeeded to

the chief command, receiving for the fourth time the thanks of Parliament and a baronetcy. In 1814 he was made a general. He died in 1829.

Baird, SPENCER FULLERTON, naturalist, born at Reading, Pennsylvania, in 1828. He was assistant secretary, and afterwards secretary, of the Smithsonian Institution, Washington, and was also chief government commissioner of fish and fisheries. He wrote much on natural history, his chief works being *The Birds of N. America* (in conjunction with John Cassin); *The Mammals of N. America*; *Review of American Birds in the Smithsonian Institution*; and (with Messrs. Brewer and Ridgway) *History of North American Birds*. He died in 1887.

Baireuth (bf-roit), a well-built and pleasantly-situated town of Bavaria, on the river Main, 41 miles northeast of Nürnberg. The principal edifices, besides churches, are the old and the new palace, the opera-house, the gymnasium, and the national theater, constructed after the design of the composer Wagner, and opened in 1876 with a grand performance of his tetralogy of the Nibelungen Ring. Industries: cotton spinning, sugar refining, musical instruments, sewing-machines, leather, brewing, etc. There is a monument to Jean Paul F. Richter, who died here. Pop. 34,547.

Baius (brus), or DE BAY, MICHAEL, Catholic theologian, was born 1513, in Hainaut, educated at Louvain, made professor of theology there in 1563 or 1564, and chosen a member of the Council of Trent. Leaving the scholastic method, he founded systematic theology directly upon the Bible and the Christian fathers, of whom he particularly followed St. Augustine. His doctrines of original sin and of salvation by grace led to his persecution as a heretic by the old Scots and the Jesuits, who succeeded in obtaining a papal bull in 1587 condemning the doctrines imputed to him. Baius, however, remained in the possession of his dignities, was appointed in 1578 chancellor of Louvain University; he obtained a great name as leader in the anti-scholastic reaction of the 16th century. He died in 1589. His Augustinian views descended to the Jansenists, while his doctrine of pure, undivided love to God formed one of the main distinctions of Quietism.

Baize (báz), a sort of coarse woollen fabric with a rough nap, now generally used for linings, and mostly green or red in color.

Baja (bo'yo), a market town of Hungary, district of Bacs, on the Danube.

with a trade in grain and wine, and a large annual hog fair. Pop. 20,861.

Bajaderes. See *Bayaderes*.

Bajaset (ba-yah-set'), or **BAYASID**, I, a Turkish emperor. In 1389, having strangled his brother Jacob, he succeeded his father Murad or Amurath, who fell in the battle of Cassova against the Servians. From the rapidity of his conquests he received the name of *Il-derim*, the Lightning. In three years he subjected Bulgaria, part of Servia, Macedonia, Thessaly, and the states of Asia Minor, and besieged Constantinople for ten years, defeating Sigismund and the allied Hungarians, Poles, and French, in 1396. The attack of Timur (Tamerlane) on Natolia, in 1400, saved the Greek Empire, Bajaset being defeated and taken prisoner by him near Ancyra, Galatia, in 1402. The story of his being carried about in a cage by Timur is improbable; but Bajaset died in 1403, in Timur's camp, in Caramania. His successor was Soliman I.

Bajaset II succeeded his father, Mohammed II, sultan of the Turks, in 1481. He increased the Turkish Empire by conquests on the N. W. and in the E., took Lepanto, Modon, and Durazzo in a war against the Venetians, and ravaged the coasts of the Christian states on the Mediterranean, to revenge the expulsion of the Moors from Spain. Having abdicated in favor of his younger son Selim, he died on his way to a residence near Adrianople in 1513. He did much for the improvement of his empire and the promotion of the sciences.

Bajocco, or **BAIOCCO** (ba-yok'o), was a copper coin in the Papal States, the hundredth part of a scudo, or rather more than a halfpenny. The name was also given in Sicily to the Neapolitan *grano*, the hundredth part of the ducato 80 cts.

Bajus. See *Batus*.

Bajza (boi'za), **JOSEPH**, Hungarian lyric poet, historian, and critic, born in 1804; died in 1858. As contributor and editor of various periodicals he played an important part in the development of modern Hungarian literature and drama. A volume of his poems, of high merit, was published in 1835. He also translated a collection of foreign dramas, and edited a series of historical works.

Bakalahari (ba-ka-la-ha'ri), a Bechuana tribe inhabiting the Kalahari Desert, South Africa.

Bakarganj (bak-ur-gunj'), a maritime district and town in Bengal; chief rivers: Ganges, Brahmaputra,

and Meghna. Area, 3649 sq. miles. Pop. 2,154,000. The town lies in ruins. **Bakau** (baikou), a town of Roumania, on the Bistritza. Pop. 16,197.

Bakohisarai (ba-k-hi-sa-ri'), or **BASTOHISARAI** (ba-che-se-ri'; Turkish, 'Garden Palace'), an ancient town of Russia, in the Crimea, picturesquely situated at the bottom of a narrow valley, hemmed in by precipices. It contains the palace of the ancient Crimean khans. Pop. 16,000.

Bakelite (ba'ke-lit), a substance first produced in the United States (under the direction of Dr. L. H. Baekeland) from the chemical union of phenols and formaldehyde. It is an amber-like substance with high electrical insulating properties and great strength, is insoluble in all known solvents and resists most chemicals. It does not melt at 300° C. or over, though at higher temperatures it chars and burns. Before assuming its final form bakelite is a liquid which solidifies under heat, and is used to impregnate coils for dynamos, to harden wood and other porous bodies, etc. Transparent bakelite is used for pipe stems, jewelry and other articles for which inflammable celluloid was formerly employed. It is sometimes compounded with asbestos or wood pulp, and is also used as a varnish. The chemical name for this substance is oxybenzyl-methyljen-glycolanhydride.

Baker, NEWTON DIERL, Secretary of War under President Wilson (Second Term), was born in Martinsburg, Virginia, and educated at Johns Hopkins University (1892) and Washington and Lee University. He was admitted to the bar in West Virginia in 1894. In 1897, he removed to Cleveland, Ohio, and in 1902 was elected City Solicitor, holding this office until 1912. He was a prominent figure in the successful fight for three-cent trolley fares. In 1911 he was elected Mayor of Cleveland, serving until 1915. In 1916 he entered the Cabinet, succeeding Lindley M. Garrison, and supported the legislation which resulted in the Selective Service Law. See *Conscription*.

Baker, SIR SAMUEL WHITE, a distinguished English traveler, born in 1821. He resided some years in Ceylon; in 1861 began his African travels, which lasted several years, in the Upper Nile regions, and resulted, among other discoveries, in that of Albert Nyanza in 1864, and of the exit of the White Nile from it. He returned in 1873, having finished his work, and was succeeded by the celebrated Gordon. His writings include: *The Nile and the Hound in Ceylon*; *Eight*

Years' Wanderings in Ceylon; The Albert Nyansa, etc. The Nile Tributaries of Abyssinia. He died December 30, 1893.

Baker, THOMAS, antiquary, born in 1658, educated at Cambridge. As a non-juror he lost his living at Long-Newton in 1690, and was compelled to resign his fellowship on the accession of George I, but continued to reside at St. John's College till his death in 1740. His *Reflections on Learning* (1709-10) went through seven editions. He left in MS. forty-two folio volumes of an *Athenae Cantabrigienses*, from which a *History of St. John's College* was edited by Professor Mayor in 1809.

Baker, capital of Baker county, Oregon; on the Powder River; in a gold and silver, agricultural and stock-raising district. Has woodworking and other industries. Pop. 6742.

Bakersfield, a city, the county seat of Kern county, California, on the Kern River, 800 miles S. E. of San Francisco. It is a shipping point for produce, and has oil refineries, fruit-packing works, carshops, etc. Pop. 21,000.

Bakewell (bák'wel), an ancient market-town, England, county of Derby, between Buxton and Matlock, possessing a fine Gothic church, a chalybeate spring, a cotton-mill erected by Arkwright, and a large marble-cutting industry. Pop. 3078.

Bakewell, ROBERT, an English agriculturist, celebrated for his improvements in the breeding of sheep, cattle, and horses, was born in Leicestershire in 1725, and died in 1795. He was the originator of the Leicestershire breed of sheep, which have since been so well known, and also of a breed of cattle that had great repute in their day. Various improvements in farm management were also introduced by him.

Bakmut (bak-möt'), a town of Russia, 25 miles E. of Yekaterinoslap; here are large deposits of salt and coal. Pop. 20,000.

Bakhuisen. See *Backhuysen*.

Baking (bák'ing), a term used in various senses. For the baking of bread, see *Bread*. A common application of the term is to a mode of cooking food in a close oven, baking in this case being opposed to roasting or broiling, in which an open fire is used. The oven should not be too close, but ought to be properly ventilated. Baking is also applied to the hardening of earthenware or porcelain by fire.

Baking Powder, a mixture of bicarbonate of soda and tartaric acid, usually with some flour

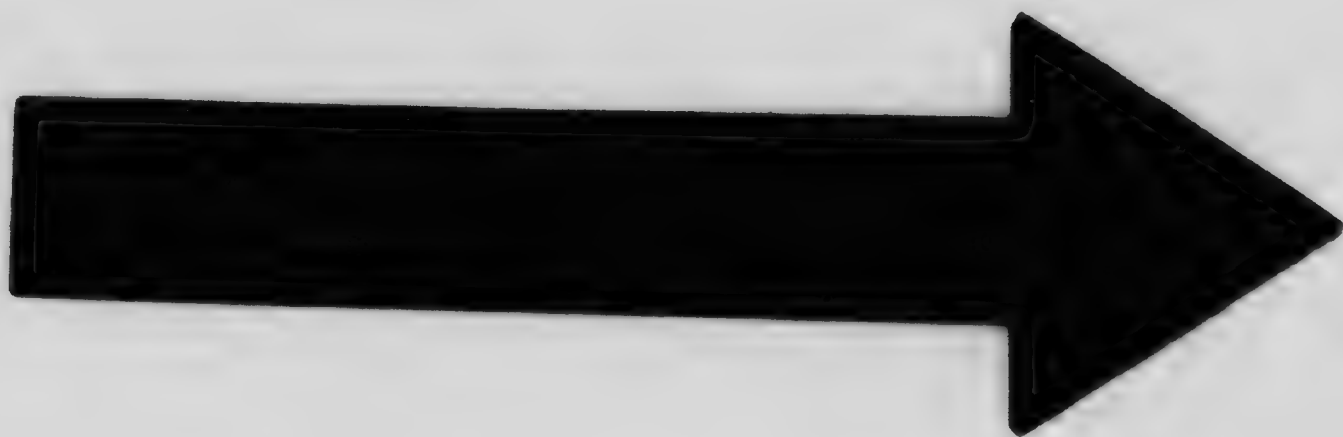
added. The water of the dough causes the liberation of carbonic acid, which makes the bread 'rise.'

Bakony Wald (ba-kon'yé), a thickly-wooded mountain range dividing the Hungarian plains, famous for the herds of swine fed on its mast.

Bakshish (bak-shish'), an Eastern term for a present or gratuity. A demand for bakshish meets travelers in the East everywhere from Turkey and Egypt to Hindustan.

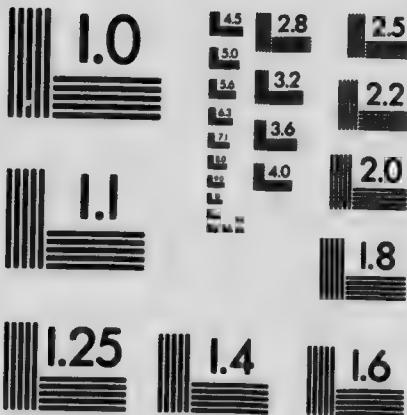
Baku (bá-kö'), a Russian port on the western shore of the Caspian, occupying part of the peninsula of Apsheron. The naphtha or petroleum springs of Baku have long been known; and the 'Field of Fire,' so called from emitting inflammable gases, has long been a place of pilgrimage with the Guebres or Fire-worshippers. Recently, from the development of the petroleum industry, Baku has greatly increased, and is now a large and flourishing town. Over 1500 oil-wells are in operation, producing immense quantities of petroleum, much of which is led direct in pipes from the wells to the refineries in Baku. Some of the wells have had such an outflow of oil as to be unmanageable, and the Baku petroleum now competes successfully with any other in the markets of the world, more than 60,000,000 barrels being produced annually. This is a falling off since 1901, when 85,000,000 barrels were produced. It is a heavy product, yielding a small percentage of burning oil, but the cheapness of the crude oil enables it to be refined profitably, since the remaining material can be sold for fuel. Baku is the station of the Caspian fleet, is strongly fortified, and has a large shipping trade. The population grew from 12,400, in 1870, to over 100,000 in 1900 and 206,000 in 1910.

Bakunin (bá-kú'nén), MICHAEL, a Russian anarchist, reputed founder of Nihilism, born 1814 of a noble family, entered the army, but threw up his commission after two years' service, and studied philosophy at Moscow, with his friends Herzen, Turgenieff, Granowski (historian), and Belinski (critic). Having adopted Hegel's system as the basis of a new revolution, he went in 1841 to Berlin, and thence to Dresden, Geneva, and Paris, as the propagandist of anarchism. Wherever he went he was influential for disturbance, and after undergoing imprisonment in various states, was handed over to Russia in 1851 by Austria, imprisoned for five years, and finally sent to Siberia. Escaping thence through Japan, he joined Herzen in Lon-



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don on the staff of the *Kolokol*. His extreme views and violent tendencies finally led to a quarrel with Marx and the International; and having fallen into disrepute with his own party in Russia, he died suddenly and almost alone at Berne, in 1876. He demanded the entire abolition of the state, the absolute equalization of individuals, and the extirpation of hereditary rights and of religion, his conception of the next stage of social progress being purely negative and annihilatory.

Bala (ba'la), a lake 4 miles long, and a small town of N. Wales, in Merionethshire.

Balaam (ba'lam), a heathen seer, invited by Balak, King of Moab, to curse the Israelites, but compelled by miracle to bless them instead (Numbers, xxii-xxiv). In another account he is represented as aiding in the perversion of the Israelites to the worship of Baal, and as being, therefore, slain in the Midianitish war (Numbers, xxxi; Joshua, xiii). He is the subject of many rabbinical fables, the Targumists and Talmudists regarding him, as most of the fathers did, in the light of an impious and godless man.

Bala Beds, a local deposit, in the Bala district, North Wales, consisting of slates, grits, sandstones, and limestones, there being two limestones separated by sandy and slaty rocks about 1400 ft. thick. They contain trilobites of many species, as well as other fossils. The lower Bala limestone (25 ft. thick) may be traced over a large area in North Wales.

Balachong (ba-la-chong'), an oriental condiment, composed of small fishes, or shrimps, pounded up with salt and spices and then dried.

Balæna (ba-læ'na), the genus which includes the Greenland or right whale, type of the family Balænidæ, or whalebone whales.

Balæniceps (ba-læ'ni-seps; 'whale-head'), a genus of wading birds belonging to the Soudan, intermediate between the herons and storks, and characterized by an enormous bill, broad and swollen, giving the only known species (*B. res*), also called shoe-bird, a peculiar appearance. It feeds on fishes, water snakes, carrion, etc., and makes its nest in reeds or grass adjoining water. The bill is yellow, blotched with dark brown, the general color of the plumage dusky gray, the head, neck, and breast slaty, the legs blackish.

Balænoptera (ba-læ-nop'tér-a), the genus to which the torqual whale belongs. See *Rorqual*.

Balagarh (ba-lá-gar'), a town of Hindustan in the Punjab. Pop. 11,223.

Balakiref (ba-lá'ki-ref), **MILY ALEXANDRIVITCH**, a Russian composer and conductor, born at Nijni-Novgorod, January 2, 1837; died at St. Petersburg, June 24, 1910. He was one of the founders of the new Russian school. His compositions are the symphonic poems, *Thamar, Russia*, a symphony, and a collection of Russian folk songs.

Balaklava (ba-lá-klá'vá), a small seaport in the Crimea, 8 miles S. S. E. of Sebastopol. In the Crimean war it was captured by the British in a heroic battle, Oct. 25, 1854.

Balalaika (ba-lá-lí'ka), a musical instrument of very ancient Slavonic origin, common among the Russians and Tartars. It is a narrow, shallow guitar with two to four strings.

Balance (bal'ans), an instrument employed for determining the quantity of any substance equal to a given weight. Balances are of various forms; in that most commonly used a horizontal beam rests so as to turn easily upon a certain point known as the center of motion. From the extremities of the beam, called the center of suspension, hang the scales; and a slender metal tongue midway between them, and directly over the center of motion, indicates when the beam is level. The characteristics of a good balance are: 1st, that the beam should rest in a horizontal position when the scales are either empty or loaded with equal weights; 2d, that a very small addition of weight put into either scale should cause the beam to deviate from the level, which property is denominated the *sensibility* of the balance; 3d, that when the beam is deflected from the horizontal position by inequality of the weights in the scales, it should have a tendency speedily to restore itself and come to rest in the level, which property is called the *stability* of the balance. To secure these qualities the arms of the beam should be exactly similar, equal in weight and length, and as long as possible; the centers of gravity and suspension should be in one straight line, and the center of motion immediately above the center of gravity; and the center of motion and the centers of suspension should cause as little friction as possible. The center of motion ought to be a knife-edge; and if the balance requires to be very delicate, the centers of suspension ought to be knife-edges also. For purposes of accuracy, balances have occasionally means of raising or depressing the center of gravity, of regulating the length of the

Balance of Power

Balanus

arms, etc., and the whole apparatus is not infrequently enclosed in a glass case, to prevent the heat from expanding the arms unequally or currents of air from disturbing the equilibrium.

Of the other forms of balance, the Roman balance, or *steelyard*, consists of a lever moving freely upon a suspended fulcrum, the shorter arm of the lever having a scale or pan attached to it, and the longer arm, along which slides a weight, being graduated to indicate quantities. In some of its forms it is in use in nearly all parts of the world. A variety of this, the Danish balance, has the weight fixed at the end of the lever, the fulcrum being movable along the graduated index. The *spring-balance* shows the weight of articles by the extent to which they draw out or compress a spiral spring. It is of service where a high degree of exactness is not required, and finds application in the dynamometer for measuring the force of machinery. It is also used in various forms as household scales and among merchants.

Balance of Power, a political principle which first came to be recognized in modern Europe during the 16th century, though it appears to have been also acted on by the Greeks in ancient times, in preserving the relations between their different states. An equilibrium between the various powers that form the family of nations is essential to the existence of any international law, which is the code of rules established by custom or defined in treaties. The object in maintaining the balance of power is to secure the general independence of nations as a whole, by preventing the aggressive attempts of individual states to extend their territory and sway at the expense of weaker countries. The first European monarch whose ambitious designs induced a combination of other states to counteract them was the Emperor Charles V, similar coalitions being formed in the end of the seventeenth century, when the ambition of Louis XIV excited the fears of Europe, and a century later against the exorbitant power and aggressive schemes of the first Napoleon. More recently still we have the instance of the Crimean war, entered into to check the ambition of Russia. Since then there have been various alliances among the nations, notably the Triple Alliance, comprising Germany, Austria-Hungary and Italy, formed for the object of protection against Russia. From this alliance Italy withdrew during the European war and ranged herself with the foes of her former allies. To counter-balance the Triple Alliance King Edward VII of England helped to form the now

famous Triple Entente, among England, France, and Russia.

Balance of Trade, the difference between the stated money values of the exports and imports of a country. The balance is erroneously said to be 'in favor' of a country when the value of the exports is in excess of that of the imports and 'against it' when the imports are in excess of the exports. The phrases date from the days of the mercantile system, the characteristic doctrine of which alleged the desirability of regulating commerce with a view of amassing treasure by exporting produce largely, importing little merchandise in return, and receiving the balance in bullion. In certain conceivable political and industrial conditions this may have had beneficial results; but its importance was greatly overestimated, and the state of this balance came to be regarded as an invariable criterion of the industrial condition of a country. The false analogy of the successful merchant who gains more than he spends became the basis of popular reasoning, the products of a country being mistakenly identified with its exports, its consumption with its importation. It is now generally recognized that if bullion be exported from a country it is because it is at the time the cheapest commodity available for export; and further, that there are certain natural limits to its undue exportation, in that the increased scarcity of money is attended with a fall in the money-value of other commodities, which thus in turn become preferable objects of exportation, while bullion flows back. The excess of the value of imports over that of exports, which is regarded by some as an adverse and alarming symptom in British trade, is in large part readily accounted for on the ground of shipping receipts, insurance returns, interest on capital, employment in foreign trade, merchants' profits, and the income derived from foreign investments.

Balanoglossus (bal-an-o-glos'us), a worm-like animal of much interest from its seeming to form a link between the vertebrates and invertebrates. It is a very soft-bodied creature, which lives in fine sand, which it appears to saturate with slime. Four species of its genus are known, their interesting feature being a structure which some look upon as the primitive aspect of the dorsal nerve chord, and the supporting axis of vertebrates. It has also gill slits like those of vertebrates.

Balanus (bal'a-nus; 'acorn-shells'), a genus of sessile cirripeds, family Balanidae, of which colonies are to

be found on rocks at low water, on timbers, crustaceans, shells of mollusca, etc. They differ from the barnacles in having a symmetrical shell, and being destitute of a flexible stalk. The shell consists of



Balanus Shells.

six plates, with an operculum of four valves. They pass through a larval state in which they are not fixed, moving by means of swimming feet which disappear in the final state. All the Balanidae are hermaphrodite. A South American species (*Balanus psittacus*) is eaten on the coast of Chile, the *Balanus tintinnabulum* by the Chinese. The old Roman epicures esteemed the larger species.

Balapur (bā-lā-pūr'), town of India in Akola district, Berar, with strong fort and fine pavilion of black stone. Pop. about 10,000.

Balas (bal'as), a name used to distinguish the rose-colored species of ruby from the ruby proper.

Balasar (bal-a-sōr'), a seaport town, Hindustan, presidency of Bengal, province of Orissa, headquarters of a district and subdivision bearing the same name. It carries on a considerable traffic with Calcutta. Pop. about 20,000.

Balata (ba-la'ta), a gum yielded by *Mimusops Balata*, a tree growing abundantly in British, French, and Dutch Guiana, Honduras and Brazil, obtained in a milky state by 'tapping' the tree, and hardening to a substance like leather. Used for similar purposes to India rubber. Owing to its strength it is much used in the manufacture of belting.

Balaton (bo'lo-ton), or PLATTENSEE (plāt-tin-zā'), a lake of Hungary, 55 miles s. w. of Pesth; length, 50 miles; breadth, 3 to 7½ miles; area, about 226 square miles. Of its 32 feeders the Szala is the largest, and the lake communicates with the Danube by the rivers Sio and Sarviz. It abounds with a species of perch.

Balbec. See Baalbek.

Balbi (bal'bē), ADRIEN, geographer and statistician, born at Venice in 1782. In 1806 his first work on geography procured his appointment as professor of

geography in the College of San Michele at Murano, and he became in 1811 professor of natural philosophy in the Lyceum at Fermo. In 1820 he proceeded to Portugal, and collected there materials for his *Essai Statistique sur le Royaume de Portugal et d'Algarve* and *Variétés Politiques et Statistiques de la Monarchie Portugaise*, both published in 1822 at Paris, where he resided till 1832. He then settled in Padua, where he died in 1848. Balbi's admirable *Abrégé de Géographie* was written at Paris, and translated into the principal European languages.

Balbi, GASPARO, a Venetian dealer in precious stones, born about the middle of the sixteenth century, who traveled first to Aleppo and thence down the Euphrates and Tigris to the Malabar coast, sailing finally for Pegu, where he remained for two years. His *Viaggio nelle Indie Orientali*, published on his return to Venice in 1590, contains the earliest account of India beyond the Ganges.

Balbo (bal'bo), CESARE, Italian author and statesman, born in 1789 at Turin. After holding one or two posts under the patronage of Napoleon, he devoted himself to history, publishing a history of Italy prior to the period of Charlemagne, a compendium of Italian history, etc. His *Speranze d'Italia* (1843), a statement of the political condition of Italy, and of the practicable ideals to be kept in view, gave him a wide reputation. He died in 1853.

Balboa (bal-bō'a), VASCO NUÑEZ DE, one of the early Spanish adventurers in the New World; born in 1475. Having dissipated his fortune, he went to America, and was at Darien with the expedition of Francisco de Enciso in 1510. An insurrection placed him at the head of the colony, but rumors of a western ocean and of the wealth of Peru led him to cross the isthmus. On Sept. 25, 1513, he saw for the first time the Pacific, and after annexing it to Spain, and acquiring information about Peru, returned to Darien. Here he found himself supplanted by a new governor, Pedrarias Davila, with much consequent grievance on the one side and much jealousy on the other. Balboa submitted, however, and in the following year was appointed viceroy of the South Sea. Davila was apparently reconciled to him, and gave him his daughter in marriage, but shortly after, in 1517, had him beheaded on a charge of intent to rebel. Pizarro, who afterwards completed the discovery of Peru, served under Balboa.

Balbriggan (bal-brig'gan), a seaport and favorite watering-

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place, of Ireland, county of Dublin; cele-
brated for its hosiery. Pop. 2200.

Balcony (bal'kō-ni), in architecture, is a gallery projecting from the outer wall of a building, supported by columns or brackets, and surrounded by a balustrade. Balconies were not used in Greek and Roman buildings, and in the East the roof of the house has for centuries served similar purposes on a larger scale. Balconies properly so styled came into fashion in Italy in the middle ages, and were apparently introduced into Britain in the sixteenth century.

Baldachin (bal'da-kin; It. *baldacchino*), a canopy or tent-like covering of any material, either suspended from the roof, fastened to the wall, or supported on pillars over altars, thrones, pulpits, beds, portals, etc. Portable baldachins of rich materials were formerly used to shield the heads of digni-



Baldachin, Church of S. Ambrose, Milan.

taries in processions, and are still so used in the processions of the Catholic Church and in the East. The enormous bronze baldachin of Bernini placed over the tomb of the apostles in St. Peter's at Rome is one of the most famous, though surpassed in beauty by many in other European cathedrals and churches.

Balder, or **BALDUR** (bal'der, bal'dör), a Scandinavian divinity, represented as the son of Odin and Frigga, beautiful, wise, amiable, and beloved by all the gods. His mother took an oath from every creature, and even from every inanimate object, that they would not harm Balder, but omitted the mistletoe. Balder was therefore deemed invulnerable, and the other gods in sport flung stones and shot arrows at him without

harming him. But the evil god Loki fashioned an arrow from the mistletoe and got Balder's blind brother Höder to shoot it, himself guiding his aim. Balder fell dead, pierced to the heart, to the deep grief of all the gods. He is believed to be a personification of the brightness and beneficence of the sun. See *Northern Mythology*.

Baldi (bal'de), BERNARDINO, mathematician, theologian, geographer, historian, poet, etc., born at Urbino, in 1533; studied at Padua; became abbot of Guastalla. He knew upwards of twelve languages, and is said to have written over a hundred works, most of which remain in MS. His works include a poem on navigation, various translations and commentaries, *Lives of Celebrated Mathematicians*, etc. He died in 1617.

Bald'ness, loss of the hair, complete or partial, usually the latter, and due to various causes. Most commonly it results as one of the changes belonging to old age, due to wasting of the skin, hair sacs, etc. It may occur as a result of some acute disease or at an unusually early age without any such cause. In both the latter cases it is due to defective nourishment of the hair, owing to lessened circulation of the blood in the scalp. The best treatment for preventing loss of hair seems to consist in such measures as bathing the head with cold water and drying it by vigorous rubbing with a rough towel and brushing it well with a hard brush. Various stimulating lotions are also recommended, especially those containing cantharides. But probably in most cases senile baldness is unpreventable. When extreme scurfiness of the scalp accompanies loss of the hair an ointment that will clear away the scurf will prove beneficial.

Baldovinetti (bal-do-ve-net'tē), ALESSIO, a Florentine artist, born in 1427. Few of his works remain: an *Annunciation* in the cloister of the Annunziata, a *Nativity* in the cathedral, and an altar-piece preserved in the Academy at Florence. He was believed to have rediscovered the art of mosaic. Died in 1490.

Baldric (bal'd'rik), a broad belt formerly worn over the right or left shoulder diagonally across the body, often highly decorated and enriched with gems, and used to sustain the sword, dagger, or horn: also for purposes of ornament, and as a military or heraldic symbol.

Baldung, HANS, or HANS GRÜN (grün), German painter and wood engraver, born in Swabia in 1470; died in Strasburg in 1545. His work, though inferior to Dürer's, possessed many of the

same characteristics, and on this account he has been sometimes considered a pupil of the Nuremberg master. His principal paintings are the series of panels (of the date 1516) over the altar in Freiburg cathedral; others of his works are to be found at Berlin, Colmar, and Basel. His numerous and often fantastic engravings have the monogram H. and B., with a small e in the center of the H.

Bald'win I, Emperor of Constantinople, founder of the short-lived dynasty of Latin sovereigns of the Eastern empire, was born in 1172, and was hereditary Count of Flanders and Hainault. His courage and conduct in the fourth crusade led to his unanimous election as Emperor of the East after the capture of Constantinople by the French and Venetians in 1204. In the absence of Baldwin's brother with a large part of the army, the Greeks rose in revolt under the instigation of Joannices, King of Bulgaria. Baldwin marched on Adrianople, but was taken prisoner and died in captivity, 1206. Baldwin was succeeded by his brother Henry.—**BALDWIN II**, fifth and last Latin Emperor of Constantinople, was born in 1217. During his minority John de Brienne was regent, but on his assuming the power himself the empire fell to pieces. In 1261 Constantinople was taken by the forces of Michael Paleologus, and Baldwin retired to Italy, dying in 1273.

Baldwin I, King of Jerusalem, reigned 1100-18, having assumed the title which his elder brother Godfrey de Bouillon had refused. He subdued Caesarea, Ashdod, Tripolis, and Acre.—**BALDWIN II**, his nephew and successor, reigned 1118-31. During his reign the reduction of Tyre and the institution of the order of Templars took place.—**BALDWIN III**, King of Jerusalem from 1143 to 1162, was son and successor of Foulques of Anjou, and the embodiment of the best aspects of chivalry. After defeating Nouredin in 1152, and again in 1157, he was enabled to devote himself to the hopeless task of improving the kingdom and establishing the Christian chivalry in the East. He died in 1162 and was succeeded by his brother Amalric I.

Bâle (bäl). See *Basel*.

Bale (bäl), JOHN, an English ecclesiastic, born in Suffolk in 1495; died in 1563. Although educated a Roman Catholic, he became a Protestant, and the intolerance of the Catholic party drove him to the Netherlands. On the accession of Edward VI he returned to England, was presented to the living of Bishopstoke,

Hampshire, and soon after nominated Bishop of Ossory, in Ireland. Here, on his preaching the reformed religion, the popular fury against him reached such a pitch that in one tumult five of his domestics were murdered in his presence. On the accession of Mary he lay some time concealed in Dublin, and after many hardships found refuge in Switzerland. At her death he was appointed by Elizabeth a prebend of Canterbury, where he died. His fame as an author rests upon his *Scriptorum Illustrum Majoris Britanniae Catalogus*, or 'An Account of the Lives of Eminent Writers of Britain,' containing fourteen centuries, being rewritten from an earlier work embracing only five centuries. It is compiled from various writers, chiefly from the antiquary Leland. He was also the author of nineteen miracle plays, printed in 1558.

Baleario Crane (*Balearica pavonina*), a handsome species of crested crane inhabiting Northwest Africa.

Balearic (bal-e-ar'ik) ISLANDS, a group of five islands, S. E. of Spain, including Majorca, Minorca, Iviza, Formentera and Cabrera. The popular derivation of the ancient name *Baleares* (Gr. *ballein*, to throw) has reference to the reputé of the inhabitants for their skill in slinging, in which they distinguished themselves both in the army of Hannibal and under the Romans, by whom the islands were annexed in 123 B.C. After being taken by the Vandals, under Genseric, and in the eighth century by the Moors, they were taken by James I, King of Aragon, 1220-34, and constituted a kingdom, which in 1375 was united to Spain. The islands now form a Spanish province, with an area of 1860 square miles, and 312,646 inhabitants. See separate articles.

Baleen (ba-lén'), whale-bone in the rough or natural state.

Bale-fire (A. Saxon *bæl*, a great fire), in its older and strict meaning any great fire kindled in the open air, or in a special sense the fire of a funeral pile. It has frequently been used as synonymous with beacon-fire, or a fire kindled as a signal, Sir Walter Scott having apparently been the first to employ it in this sense; and it has at various times, with even less reason, been confounded with 'bale' in the sense of evil or fatal.

Balen (bä'len), HENDRIK VAN, painter, born at Antwerp 1575; died 1632. His works, chiefly classical, religious, and allegorical—some of them executed in partnership with Breughel—are to be found in most of the European galleries.

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He was the first master of Vandyck and Snyders. Three of his sons also followed the art, but the best of them, John van Balen (1611-54), was inferior to his father.

Bales (bälz), PETER, a famous calligrapher, born in London in 1547, died about 1610. His skill in micrography is referred to by Hollinshed and Evelyn. He was one of the early inventors of shorthand, and is said to have been employed to imitate signatures by Sir Francis Walsingham during the reign of Queen Elizabeth.

Balfe (balf), MICHAEL WILLIAM, composer, was born in Dublin May 15, 1808. In his seventh year he performed in public on the violin, and at sixteen took the part of the Wicked Huntsman in *Der Freischütz* at Drury Lane. In 1825 he went to Italy, wrote the music for a ballet *La Peyrouse* for the Scala theater at Milan, and in the following year sang at the Théâtre Italien, Paris, with moderate success. He returned to Italy, and at Palermo produced his first opera, *I Rivali* (1829). For five years he continued singing and composing operas for the Italian stage. In 1835 he returned to England, and his *Siege of Rochelle*, received with favor at Drury Lane, was followed by the *Maid of Artois* (1836), *Joan of Arc* (1837), *Falstaff* (1838), *Bohemian Girl* (1843), *Maid of Honor* (1847), *Rose of Castile* (1857), *Satanella* (1858), *Blanche de Nevers* (1860), etc. The composer died October 20, 1870. His posthumous opera, *The Talisman*, was first performed in London in June, 1874. His operas are melodious and many of the airs are excellent.

Balfour (bal'fur) SIR ANDREW, a Scottish botanist and physician, born in Fifeshire in 1630. After completing his studies at St. Andrews and London, he settled at Edinburgh, where he planned, with Sir Robert Sibbald, the Royal College of Physicians, and was elected its first president. Shortly before his death he laid the foundation of a hospital in Edinburgh, which though at first narrow and confined, expanded into the Royal Infirmary. He died in 1694. His familiar letters were published in 1700.

Balfour, ARTHUR JAMES, an English statesman, born in 1848, educated at Cambridge, entered Parliament in 1874 and became private secretary to his uncle, Lord Salisbury. He was made secretary for Scotland in 1886; chief secretary for Ireland in 1889; was first lord of the treasury and leader of the House 1892-3 and after 1895. He succeeded Lord Salisbury as Unionist Prime

Minister in 1902, holding the post until 1905. During the coalition war ministry he became first lord of the Admiralty in 1915; later Secretary of State for foreign affairs. He was head of the British war mission to the United States in 1917. Author of 'Foundations of Belief' and other works.

Balfour, FRANCIS MAITLAND, an embryologist, born in 1851, studied at Harrow and Trinity College, Cambridge. Articles on his special study gained him a high reputation while still an undergraduate, and after further work at Naples he published in 1874, in conjunction with Dr. M. Foster, the *Elements of Embryology*, a valuable contribution to the literature of biology. He was elected a fellow of his college, fellow and member of council of the Royal Society, and in 1881 professor of animal morphology at Cambridge. The promise of his chief work, *Comparative Embryology* (1880-81) was unfulfilled, as in the latter year he was killed by a fall on Mont Blanc.

Balfour, SIR JAMES, a Scottish lawyer and public character of the sixteenth century, was a native of Fifeshire. In youth, for his share in the conspiracy against Cardinal Beaton, he was condemned with Knox to the galleys; but after his escape in 1550 he found it to his interest to change his opinions, and later he was appointed, through the favor of Queen Mary, Lord of Session, and member of the privy-council. In 1567 he was appointed governor of Edinburgh Castle, but had no scruple in surrendering it to Murray, who made him president of the Court of Session. In 1570 he was charged with a share in the murder of Darnley, but got off by bribery. He was afterwards instrumental in compassing the death of Regent Morton by the production of a deed signed by him and bearing on the Darnley murder. His own death took place in 1583.

Balfour, JOHN HUTTON, a distinguished botanist, born 1808, died 1884. He graduated at Edinburgh University in arts and in medicine; in 1841-45 was professor of botany in Glasgow University; and in the latter year removed to Edinburgh to occupy a similar post, resigning his chair in 1879. He wrote valuable botanical text-books, including *Elements*, *Outlines*, *Manual*, and *Classbook*, besides various other works.

Balfroosh [(bal-frush'), or BAE-FURUSH', a town of Persia, province of Mazanderan, about twelve miles from the Caspian, a great emporium of the trade between Persia and Russia. Pop. estimated 50,000.

Bali (ba'li), an island of the Indian Archipelago east of Java, belonging to Holland; greatest length, 85 miles; greatest breadth, 55 miles; area, about 2280 square miles; pop. about 700,000. It consists chiefly of a series of volcanic mountains, of which the loftiest, Azoong, reaches an elevation of 10,497 ft., the central chain averaging 3282 ft. Principal products, rice, cocoa, coffee, indigo, cotton, etc. The people are akin to those of Java and are mainly Brahmans in religion. It is divided into eight provinces under native rajahs, and forms one colony with Lombok.

Baliol, or **BALLIOL** (ba'li-ol or bal'li-ol), **JOHN DE**, of Barnard Castle, Northumberland, father of King John Balliol, a great English (or Norman) baron in the reign of Henry III, to whose cause he strongly attached himself in his struggles with the barons. In 1263 he laid the foundation of Balliol College, Oxford, which was completed by his widow Devorguilla or Devorgilla. She was daughter and co-heiress of Allan of Galloway, a great baron of Scotland, by Margaret, eldest daughter of David, Earl of Huntingdon, brother of William the Lion. It was on the strength of this genealogy that his son John Balliol became temporary King of Scotland. He died 1296.

Baliol, or **BALLIOL**, **JOHN**, King of Scotland; born about 1249, died 1315. On the death of Margaret, the Maiden of Norway and grandchild of Alexander III, Baliol claimed the vacant throne by virtue of his descent from David, Earl of Huntingdon, brother to William the Lion, King of Scotland (see above art.). Robert Bruce (grandfather of the king) opposed Baliol; but Edward I's decision was in favor of Baliol, who did homage to him for the kingdom, Nov. 20, 1292. Irritated by Edward's harsh exercise of authority, Baliol concluded a treaty with France, then at war with England; but after the defeat at Dunbar he surrendered his crown into the hands of the English monarch. He was sent with his son to the Tower, but, by the intercession of the pope in 1297, obtained liberty to retire to his Norman estates, where he died.—His son, **EDWARD**, in 1332 landed in Fife with an armed force, and having defeated a large army under the regent Mar (who was killed), got himself crowned king, but was driven out in three months.

Balista, or **BALLISTA** (bal-lis'ta), a machine used in military operations by the ancients for hurling heavy missiles, thus serving in some degree the purpose of the modern cannon. The motive power appears to have been ob-

tained by the torsion of ropes, fibers, catgut, or hair. They are said to have sometimes had an effective range of a quarter of a mile, and to have thrown stones weighing as much as 300 lbs. The ballista differed from the *catapultæ*, in that the latter were used for throwing darts.

Balis'tidæ. See *Trigger-fishes*.

Balize (ba-léz'). See *Belize*.

Bal'kan (anc. *Hæmus*), a rugged chain of mountains, extending from Cape Emineh, on the Black Sea, in Eastern Roumelia, westward to the borders of Servia, though the name is sometimes used to include the whole mountain system from the Black Sea to the Adriatic, the region south of Austria and Russia, or south of the Danube and Save, forming the Balkan Peninsula. The range, which is over 200 miles in length, forms the water-shed between the streams flowing northward into the Danube and those flowing southward to the Ægean, the chief of the latter being the Maritza. The average height is not more than 5000 ft., but the highest point, Olympus is 9794 ft. As a political boundary it divides Bulgaria from eastern Roumelia. It was long the natural bulwark of Turkey against enemies on its European frontiers. Yet in the Russo-Turkish war of 1877-78 the Russian troops managed to cross it without great difficulty, though they had to encounter a stubborn resistance at the Shipka Pass, where a Turkish army of 32,000 men ultimately surrendered to them.

Balkan Free States, Bulgaria, Roumania, Greece and Albania.

Balkan War. In 1912 war broke out between Turkey and the Balkan states—Bulgaria, Servia, Montenegro and Greece. The Porte had for centuries struggled to raise in Macedonia a barrier against the forces of western civilization and every attempt made by European powers to reform institutions ended in failure. The treatment of the Christian subjects of Turkey was often one of revolting cruelty. These facts, and the gradual infusion of western ideas among the population of the Turkish provinces, led to widespread dissatisfaction. The war was at the root a struggle between the diverse political systems and social conditions of the West and the East.

Domestic unrest in Turkey and the distractions of the Turko-Italian war made the year 1912 an opportune time for the states to act. On October 8 war was declared on Turkey by Montenegro.

and on October 17 by Greece. By the end of October the allies had practically possessed themselves of Macedonia, and the Bulgarians were holding the main Turkish force behind a fortified line within 50 miles of Constantinople. War continued until December 3, the Montenegrins besieging Skutari, the Servians capturing Monastir and Durazzo, the Greeks capturing Solonika, and the Bulgarians, in their attempt to overwhelm the Turks in Thrace and push them back

according to an agreement made before the war, the territory to be occupied by the victorious States was to be apportioned upon a pre-arranged plan; but the Powers stepped in and set up out of the territory which was to have fallen to the share of Servia and Greece, the autonomous principality of Albania. Bulgaria refused to recognize this new condition or the justice of the Greek and Servian demands for compensation for the loss of Albania or for their support

of the Bulgarian operations in Thrace. The Bulgars refused to give over any of Macedonia to the Servians and Greeks. The Greeks concluded with the Servians a secret treaty of offense against Bulgaria and a second war was soon in progress. Roumania joined the enemies of Bulgaria, coveting a strip of territory on the south side of the Danube.

While the Roumanians fought no battle worth mentioning it was their presence within thirty miles of the Bulgarian capital that forced King Ferdinand to apply for terms of peace. The Treaty of Bucharest was signed on August 10, 1913, dividing up the territory as indicated on the accompanying map.



MAP OF THE BALKANS

into Constantinople, winning the great battles of Kirk-Killiseh, Lule Burgas and Serai. The armistice of December 3, suspended hostilities and the negotiations of peace opened in London December 16.

Approached by the powers, Turkey finally consented to yield a large portion of her territory. The consent, however, led to angry demonstrations in Constantinople and the overthrow of the Kiamil Cabinet. On February 3 hostilities were reopened. On March 16, the great Turkish stronghold, Adrianople fell before the Bulgarians and Servians after a five months' siege.

Peace was not concluded until May 30, 1913. The Treaty of London provided that Turkey should cede to the allies of Europe all territory on the mainland of Europe west of a line to be drawn from Enos to Midia. Turkey ceded Crete to the allies. The disposition of the rest of the Turkish isles was left to the Powers.

Disagreement among the allies as to the settlement of boundaries immediately arose, leading to open hostilities. Ac-

garia showed herself the leader. It was she who conceived the plan of the campaign and without her well-trained army the struggle against Turkey could never have been so successfully carried on. The second Balkan war left Bulgaria with hopes unfulfilled, and when the Great war broke out in 1914 she sided with Germany and Austria-Hungary; the only one of the Balkan nations to join hands with the Central Power. Roumania, at first neutral, joined the Allies. See *European War*.

Balkh (balk or bakh), a city in the north of Afghanistan, in Afghan Turkistan, at one time the emporium of the trade between India, China and Western Asia. It was long the center of Zoroastrianism and was also an important Buddhist center. In 1220 it was sacked by Genghis Khan, and again by Timur in the fourteenth century. The remains of the ancient city extend for miles. The town is now merely a village, but a new town has risen up an hour's journey north of the old, the residence of the Afghan governor, with a population of about

10,000 to 15,000. Silk weaving is an active industry. The district, which formed a portion of ancient Bactria, lies between the Oxus and the Hindu Kush, with Badakshan to the east and the desert to the west. In the vicinity of the Oxus, where there are facilities for irrigation, the soil is rich and productive, and there are many populous villages.

Bal'kis, the Arabian name of the Queen of Sheba who visited Solomon.

She is the central figure of innumerable Eastern legends and tales.

Ball, GAME OF. Ball-playing was practiced by the ancients, and old and young amused themselves with it. The Phœacian damsels are represented in the *Odyssey* as playing it to the sound of music; and Horace represents Mæcenas as amusing himself thus in a journey. In the Greek gymnasia, the Roman baths, and in many Roman villas a *sphæristærium* (a place appropriated for playing ball) was to be found, the games played being similar to those indulged at the present day. In the middle ages the sport continued very popular both as an indoor and outdoor exercise, and was a favorite court pastime until about the end of the eighteenth century. In England football and tennis are mentioned at an early date, and a favorite game prior to the English revolution was one in which a *mall* or *wallet* was used, hence the name *pall-mall* (It. *palla*, L. *pila*, a ball) for the game and the place where it was played. The most popular modern forms are baseball, football, cricket, golf, lawn tennis, polo, racquet, lacrosse, and basket ball.

Ball (ball), JOHN, an itinerant preacher of the fourteenth century, excommunicated about 1367 for promulgating 'errors, schisms, and scandals against the pope, archbishops, bishops, and clergy.' He was one of the most active promoters of the popular insurgent spirit which found vent under Wat Tyler in 1381, and the couplet,

'When Adam dall and Eve span,
Who was thanne a gentleman?'

is attributed to him.

Ball, SIR ROBERT S., an astronomer, born at Dublin in 1840, graduated at Trinity College in 1861. His studies in astronomy made him professor of that science in Trinity and royal astronomer for Ireland in 1874, and professor of astronomy and geometry at Cambridge in 1892. He was knighted in 1886. He wrote *Experimental Physics*, *Theory of Screws*, and works on astronomy, mechanics, etc.

Ballad, a term loosely applied to various poetic forms of the song type

but in its most definite sense a poem in which a short narrative is subjected to simple lyrical treatment. It was, as indicated by its name, which is related to the Italian *ballare* and O. French *baller* to dance, originally a song accompanied by a dance. The ballad is probably one of the earliest forms of rhythmical poetic expression, constituting a species of epic in miniature, out of which by fusion and remolding larger epics were sometime shaped. As in the folk-tales, so in the ballads of different nations, the resemblances are sufficiently numerous and close to point to the conclusion that they have often had their first origin in the same primitive folk-lore or popular tales. But in any case, excepting a few modern literary ballads of a subtler kind, they have been the popular expression of the broad human emotions clustering about some strongly outlined incidents of war, love, crime, superstition, or death. It is next to certain that in the Homeric poems fragments of older ballads are embedded, but the earliest ballads, properly so called, of which we have record were the *ballistia*, or dance-songs of the Romans, of the kind sung in honor of the deeds of Aurelian in the Sarmatic war by a chorus of dancing boys. In their less specialized sense of lyric narratives, their early popularity among the Teutonic race is evidenced by the testimony of Tacitus, of the Gothic historian Jordanes, and the Lombard historian Paulus Diaconus; and many appear to have been written down by order of Charlemagne and used as a means of education. Of the ballads of this period, however, only a general conception can be formed from their traces in conglomerates like the *Nibelungenlied*; the more artificial productions of the Minnesänger and Meistersänger overlying the more popular ballad until the fifteenth century, when it sprang once more into vigorous life. A third German ballad period was initiated by Bürger under the inspiration of the revived interest in the subject shown in Great Britain and the publication of the *Percy Reliques*; and the movement was sustained by Herder, Schiller, Goethe, Heine, Uhland, and others. The earlier German work is, however, of inferior value to that of Scandinavia, where, though comparatively few manuscripts have survived, and those not more than three or four centuries old, a more perfect oral tradition has rendered it possible to trace the original stock of the twelfth century.

Of the English and Scottish ballads anterior to the thirteenth century there are few traces beyond the indication that they were abundant, if indeed anything can be definitely asserted of them earlier

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than the fourteenth century. Among the oldest may be placed *The Little Geste of Robin Hood*, *Hugh of Lincoln*, *Sir Patrick Spens*, and the *Battle of Otterbourn*. In the fifteenth century specimens multiply rapidly: ballad-making became in the reign of Henry VIII a fashionable amusement, the king himself setting the example; and though in the reign of Elizabeth ballads came into literary disrepute and ballad singers were brought under the law, yet there was no apparent check upon the rate of their production. Except perhaps in the north of England and south of Scotland, there was, however, a marked and increasing tendency to vulgarization as distinct from the preservation of popular qualities. The value of the better ballads was lost sight of in the flood of dull, rhythmless, and frequently scurrilous verse. The modern revival in Britain dates from the publication of Ramsay's *Evergreen* and *Tea-table Miscellany* (1724-27) and of the selection made by Bishop Percy from his seventeenth-century MSS. (1765), a revival not more important for its historical interest than for the influence which it has exercised upon all subsequent poetry.

The threefold wave discernible in German, if not in British, ballad history, is equally to be traced in Spain, which alone among the Latinized countries of Europe has songs of equal age and merit with the British historic ballads. The principal difference between them is, that for the most part the Spanish romance is in trochee, the British ballad in iambic metre. The ballads of the Cid date from about the end of the twelfth and beginning of the thirteenth century; and then followed an interval of more elaborate production, a revival of ballad interest in the sixteenth century, a new declension, and finally a modern and still persisting enthusiasm.

The French poetry of this kind never reached any high degree of perfection, the romance, farce, and lyric flourishing at the expense of the ballad proper. Of Italy much the same may be said, though Sicily has supplied a great store of ballads; and nearly all the Portuguese poetry of this kind is to be traced to a Spanish origin. The Russians have lyric-epic poems, of which some, in old Russian, are excellent, and the Servians are still in the ballad-producing stage of civilization. Modern Greece has also its store of ballads to which Madame Chénier called attention in the middle of last century. Both in Greece and Russia and in the Pyrenees the old habit of improvis-

ing song as an accompaniment to dance still exists.

Ballade (bal-ad'), the earlier and modern French spelling of *ballad*, but now limited in its use to a distinct verse-form introduced into English literature of late years from the French and chiefly used by writers of *vers-de-société*. It consists of three stanzas of eight lines each, with an *envoy* or closing stanza of four lines. The rhymes, which are not more than three, follow each other in the stanzas thus: a, b, a, b; b, c, b, c, and in the envoy, b, c, b, c; and the same line serves as a refrain to each of the stanzas and to the envoy. There are other varieties, but this may be regarded as the strictest, according to the precedent of Villon and Marot.

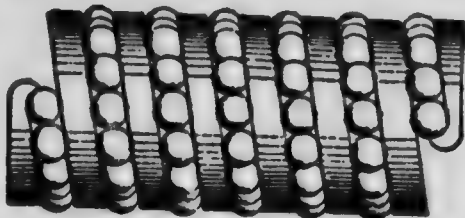
Ballantyne (bal'lan-tin), JAMES, the printer of Sir W. Scott's works, born at Kelso 1772, died at Edinburgh 1833. Successively a solicitor and a printer in his native town, at Scott's suggestion he removed to Edinburgh, where the high perfection to which he had brought the art of printing, and his connection with Scott, secured him a large trade. The printing firm of James Ballantyne & Co. included Scott, James Ballantyne and his brother John (who died in 1821). For many years he conducted the *Edinburgh Weekly Journal*. His firm was involved in the bankruptcy of Constable & Co., by which Scott's fortunes were wrecked, but Ballantyne was continued by the creditors' trustee in the literary management of the printing-house. He survived Scott only about four months.

Ballarat (bal-la-rat'), or BALLAARAT, an Australian town in Victoria, chief center of the gold-mining industry of the colony, and next in importance to Melbourne, from which it is distant W. N. W. about sixty miles direct. It consists of two distinct municipalities, Ballarat West and Ballarat East, separated by the Yarrowee Creek, and has many handsome buildings, and all the institutions of a progressive and flourishing city, including hospital, mechanics' institute and library, free public library, Anglican and R. C. cathedrals, etc. Gold was first discovered in 1851, and the extraordinary richness of the field soon attracted hosts of miners. The surface diggings having been exhausted, the precious metal is now got from greater depths, and there are mines as deep as some coal-pits, the gold being obtained by crushing the auriferous quartz. The mines give employment to over 6000 men. There are also foundries, woolen mills,

flour-mills, breweries and distilleries, etc. Population 43,701.

Ballast (bal'ast), signifies (1) heavy matter, as stone, sand, iron, or water placed in the bottom of a ship or other vessel to sink it in the water to such a depth as to enable it to carry sufficient sail without oversetting. (2) The sand placed in bags in the car of a balloon to steady it and to enable the aeronaut to lighten the balloon by throwing part of it out. (3) The material used to fill up the space between the rails on a railway in order to make it firm and solid.

Ball-bearing, an axle bearing in which the shaft is supported, not on a cylindrical surface, but on a number of small, hard steel balls, which turn freely as the shaft revolves and greatly reduce the friction. This bearing, first largely used on the bicycle, has been



Ball Bearing.

extended to wagon wheels and other axle movements, in which the element of friction is largely eliminated. Its range of application to machinery of all kinds is almost unlimited.

Ball-cock, a kind of self-acting stop-cock opened and shut by means of a hollow sphere or ball of

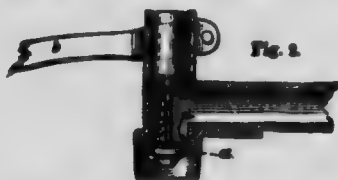


Fig. 1.



Fig. 2. Internal structure of Cock.

a, Valve shown open so as to admit water. b, Arm of the lever, which being raised shuts the valve.

metal attached to the end of a lever connected with the cock. Such cocks are often employed to regulate the supply of water to cisterns. The ball floats on the water in the cistern by its buoyancy, and rises and sinks as the water rises and sinks, shutting off the water in the one case and letting it on in the other.

Ballet (bal'ä), a species of dance, usually forming an interlude in theatrical performances, but principally confined to opera. Its object is to represent, by mimic movements and dances, actions, characters, sentiments, passions, and feelings, in which several dancers perform together. The ballet is an invention of modern times, though pantomimic dances were not unknown to the ancients. The dances frequently introduced into operas seldom deserve the name ballet, as they usually do not represent any action, but are destined only to give the dancers an opportunity of showing their skill, and the modern ballet in general, from an artistic point of view, is a very low-class entertainment.

Ball-flower, an architectural ornament resembling a ball placed

in a circular flower, the three petals of which form a cup round it; usually inserted in a hollow molding, and generally characteristic of the Decorated Gothic style of the fourteenth century.



Ballia (bal'li-a), a town of India, in the Northwestern Provinces, on the Ganges, the administrative headquarters of a district of same name. Pop. 15,320.

Ballina (bal'e-nä'), a town and river-port, Ireland, County Mayo, on both banks of the Moy, about 5 miles above its mouth in Killala Bay, with a considerable local and also a little coasting and foreign trade. Pop. 4800.

Ballinasloe (ballin-a-slo'), a town, Ireland, in Galway and Roscommon Counties, 15 miles southwest of Athlone, on both sides of the Suir, noted for its cattle fair, from 5th till 9th October, the most important in Ireland. Pop. 4904.

Ballinger (bal'in-jer), RICHARD ACHILLES, lawyer, born at Boonesboro, Iowa, in 1858; graduated at Williams College in 1884; studied law and practiced in Washington State; became judge of the superior court; was mayor of Seattle 1904-06; commissioner of General Land Office after March 4, 1877; appointed Secretary of the Interior by President Taft in 1900. As such he was accused of favoring speculators seeking to grasp the coal deposits of Alaska and

a congressional committee was appointed to investigate the charges. The committee reported in his favor, but he resigned on March 7, 1911.

Balliol College, Oxford, was founded about 1263 by John Balliol (or Baliol) of Barnard Castle, Durham, and Devorgilla, his wife (parents of John Balliol, King of Scotland). There are a large number of valuable scholarships and exhibitions, including the Snell exhibitions, fourteen in number, held by students from Glasgow University.

Ballista (bal-lis'ta). See *Ballista*.

Ballistic Pendulum, an apparatus formerly used for ascertaining the velocity of military projectiles and consequently the force of fired gunpowder. It has been supplanted by the more accurate electric-ballistic machines, such as the Boulengé chronograph and the Bashforth chronograph. In the ballistic pendulum system a piece of ordnance was fired against bags of sand supported in a strong case or frame, supported so as to swing like a pendulum. The arc through which it vibrated was shown by an index, and the amount of vibration formed a measure of the force or velocity of the projectile.

Ballistics, the science which treats of the motion of warlike missiles. It is divided into two parts: exterior ballistics, in which the motion of the projectile after it leaves the gun is considered; and interior ballistics, in which the pressure of the powder gas is analyzed in the bore.

Balloon (bal-lön'). See *Aeronautics*.

Balloon-fish (*Tetraodon lineatus*), order Plectognathi, a curious tropical fish that can inflate itself so as to resemble a ball.

Ballot, VOTING BY, signifies literally (called by the French *bullet*), usually of different colors, which are put into a box in such a manner as to enable the voter, if he chooses, to conceal for whom or for what he gives his suffrage. The method is adopted by most clubs in the election of their members—a white ball indicating assent, a black ball dissent. Hence, when an applicant is rejected, he is said to be *blackballed*. The term voting by ballot is also applied in a general way to any method of secret voting, as, for instance, when a person gives his vote by means of a ticket bearing the name of the candidate whom he wishes to support. In this sense vote by ballot is the mode adopted in electing the members of legislative assemblies in most countries, as well as the members of

various other bodies. In ancient Greece and Rome the ballot was in common. In Britain it had long been advocated for the election of members of Parliament and of municipal corporations, and was finally introduced by an act passed in 1872.

In the United States the ballot was in use in early colonial times, and was made compulsory in the constitutions of New Jersey, Pennsylvania, and all other states. The Australian ballot system, originated about 1870 in the British colonies, has recently been adopted by law in three-fourths of the United States, but with certain variations, which diminish its value as a simple and equitable system of voting. By a carefully contrived system of arranging the names on the ballot, secluding each voter at the polls, and marking and folding the ballots, it claims to secure greater secrecy and honesty than any other method of voting.

Ballou (bal-lö'), HOSEA, American theologian, born in New Hampshire in 1771. Settling at Boston in 1817, he published several theological works, in which he argued in favor of universal salvation, and subsequently issued the *Universalist Magazine*, followed by the *Universalist Expositor*, now known as the *Universalist Quarterly Review*. He is looked upon as the founder of modern Universalism. Died in 1852.

Ballymena (bal-li-mé'na), a town of Ireland, County Antrim, 22 miles from Belfast, with a considerable trade in linens and linen yarns, the manufacture of which is carried on to a great extent. Pop. (1901) 10,886.

Ballymoney (bal-li-mö'ni), a town of Ireland, County Antrim, 38 miles N.W. of Belfast; has manufactures of linen, chemicals, tanning, and brewing. Pop. 3049.

Ballyshannon, a small seaport of Ireland, County Donegal. Pop. 2400.

Balmaceda (bal-ma-sé'da), JOSÉ MANUEL, Chilean statesman, born 1838; early distinguished as a political orator; advocated in Congress separation of church and state; as premier, in 1884, introduced civil marriage; elected president in 1886. A conflict with the Congressional party, provoked by his alleged cruelties and official dishonesty, and advocacy of the claim of Signor Vicuña as his legally elected successor, resulted in Balmaceda's overthrow and suicide, 1891.

Balm of Gilead, the exudation of a tree, *Balsamodora*.

dron Gileadense, nat. order *Burseraceæ*, a native of Arabia Felix, and also obtained from the closely allied species *Balsamodendron opobalsamum*. The leaves of the former tree yield when bruised a strong aromatic scent; and the balm of Gilead of the shops, or balsam of Mecca



Balm of Gilead—*Balsamodendron Gileadense*.

or of Syria, is obtained from it by making an incision in its trunk. It has a yellowish or greenish color, a warm, bitterish, aromatic taste, and an acidulous, fragrant smell. It is valued as an odoriferous unguent and cosmetic.

Balnaves (bal-nav'es), HENRY, of Halhill, a Scottish reformer, was born at Kirkcaldy, educated at St. Andrews, and became a Lord of Session and a member of the Scottish Parliament in 1538, and secretary of state in 1543. He was one of the commissioners appointed in 1543 to treat of the proposed marriage between Edward VI and Mary. In 1547 he was one of the prisoners taken in the castle of St. Andrews and exiled to France where he wrote his *Confession of Faith*. Recalled in 1554, he busily engaged in the establishment of the reformed faith and assisted in revising the *Book of Discipline*. He died in 1579.

Balrampur (bal-ram'pur). See *Bulrampur*.

Balsa (bal'sa), a kind of raft or float used on the coast and rivers of



Balsa of Inflated Skins.

Peru and other parts of South America for fishing, for landing goods and passengers through a heavy surf, and for other purposes where buoyancy is chiefly wanted. It is in common use on Lake Titicaca, where it is made of rushes bound firmly together.

Balsam (bal'sam), the common name of succulent plants of the genus *Impatiens*, family *Balsaminaceæ*, having beautiful, irregular flowers, cultivated in gardens and greenhouses. *Impatiens balsamina*, a native of the East Indies, is a common cultivated species. The *Balsaminaceæ* are distinguished by their many-seeded fruit. See *Impatiens*.

Balsam, an aromatic, resinous substance, flowing spontaneously or by incision from certain plants. A great variety of substances pass under this name. But in chemistry the term is confined to such vegetable juices as consist of resins mixed with volatile oils, and yield the volatile oil on distillation. The resins are produced from the oils by oxidation. A balsam is thus intermediate between a volatile oil and a resin. It is soluble in alcohol and ether, and capable of yielding benzoic acid. The balsams are either liquid or more or less solid; as, for example, the balm of Gilead, and the balsams of copaiba, Peru, and Tolu. Benzoin, dragon's-blood, and storax are not true balsams, though sometimes called so. The balsams are used in perfumery, medicine, and the arts. See *Copaiba*, etc. *Balsam of Gilead* or of Mecca, balm of Gilead (which see). *Canada balsam*. See the art. *Canada Balsam*.

Balsam Fir, the balm of Gilead fir. See *Palm of Gilead*.

Balsa'mo, JOSEPH. See *Cagliostro*, Count.

Balsamodendron (bal-sa-mō-den-dron), a genus of trees or bushes, order *Burseraceæ*, species of which yield such balsamic or resinous substances as balm of Gilead, bdellium, myrrh, etc.

Balta (bál'tá), a Russian town, gov. of Podolia, on the Kodema, an affluent of the Bug, 115 miles N. N. W. of Odessa. Pop. 24,400.

Baltic (bál'tik) PROVINCES, a term commonly given to the Russian governments of Courland, Livonia, and Esthonia.

Baltic Sea, an inland sea or large gulf, connected with the North Sea, washing the coasts of Denmark, Germany, Russia, and Sweden; over 900 miles long, extending to 200 broad; superficial extent, together with the Gulfs of Bothnia and Finland, 171,743 sq. miles. Its greatest depth is 420 fathoms;

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mean, 36 fathoms. A chain of islands separates the southern part from the northern, or Gulf of Bothnia. In the northeast the Gulf of Finland stretches far into Russia, and separates Finland from Esthonia; the Gulf of Riga washes the shores of the three Russian governments of Courland, Livonia, and Esthonia; while the Gulf of Danzig is an inlet on the Prussian coast. The water of the Baltic is colder and clearer than that of the ocean; it contains a smaller proportion of salt, and the ice obstructs the navigation three or four months in the year. Among the rivers that enter it are the Neva, Dwina, Oder, Vistula and Niemen. Islands: Samsoe, Moen, Bornholm, Langeland, Laaland, which belong to Denmark (besides Zealand and Funen); Gottland and Oeland, belonging to Sweden; Rügen, belonging to Prussia; the Åland Islands, Dagoe, and Oese, belonging to Russia. The Sound, the Great and the Little Belt lead from the Kattegat into the Baltic. The Baltic and North Sea are connected by means of the Eider and a canal from it to the neighborhood of Kiel, and by the Kaiser Wilhelm canal, 61 miles long, completed in 1895, large enough to permit the passage of men-of-war.

Baltimore (bal'ti-môr), a city and port in Maryland, finely situated on the N. side of the Patapsco, 14 miles above Chesapeake Bay, 40 miles N. E. of Washington, and 96 miles S. W. of Philadelphia. Baltimore takes its name from Lord Baltimore, the founder of Maryland; it was first laid out as a town in 1729; and was incorporated as a city in 1797. It is well built, chiefly of brick, and is known as the 'monument city,' from the many public monuments which adorn it, the principal being the Washington monument. Among its notable buildings are the City Hall, built in Renaissance style, of white marble, with a tower and dome rising 260 feet; the Peabody Institute, containing a library, art gallery, etc.; the Maryland Institute; the Johns Hopkins Hospital; the Roman Catholic cathedral; the Enoch Pratt Free Library, with 200,000 volumes, and various municipal buildings. It has numerous educational institutions, chief among which, and now one of the most important in the United States, is the Johns Hopkins University, endowed with \$3,500,000 by its founder (whose name it bears). In its excellence of system and perfection of equipment it vies with the best European institutions of its kind. The University of Maryland embraces one of the oldest medical schools in the United States,

established in 1812. Druid Hill Park, on the outer limits of the city, covers about 700 acres and is noted for its natural beauty. Baltimore vies with Philadelphia as being a city of homes, each family, as a rule, having a house of its own. The leading industries are the canning of fruits and oysters and the manufacture of clothing, boots and shoes, cotton goods, machinery, etc. The canning industry is very large, the cotton-duck mills employ 6000 hands, and



there is an extensive Bessemer steel plant. Shipbuilding is also of importance. As a flour market Baltimore is an important center; and it does an immense trade in exporting tobacco and other products. The harbor is very extensive, and has lately been much improved, and several railroad lines reach the city, adding greatly to its commercial advantages. Pop. 558,485.

Baltimore, GEORGE CALVERT, LORD, born in Yorkshire about 1580; died in London, 1632. He was for some time secretary of state to James I, but this post he resigned in 1624 in consequence of having become a Roman Catholic. Notwithstanding this he retained the confidence of the king, who in 1625 raised him to the Irish peerage, his title being from Baltimore, a fishing village of Cork. He had previously obtained a grant of land in Newfoundland, but as this colony was much exposed to the attacks of the French he left it, and obtained another patent for Maryland. He died before the charter was completed, and it was granted to his son Cecil, who deputed the governorship to his brother Leonard (1603-47).

Baltimore Oriole (*ō'ri-ōl*), an American bird, the *Icterus Baltimorei*, family Icteridae, nearly allied to the Sturnidae, or starlings. It is a migratory bird, and is known also by the names of 'golden robin,' 'hang-bird,' and 'fire-bird.' It is about 7 inches long; the head and upper parts are black; the under parts of a brilliant orange hue. It builds a pouch-like nest, very skillfully constructed of threads deftly interwoven, suspended from a forked branch and shaded by overhanging leaves. It feeds on insects, caterpillars, beetles, etc. Its song is a clear, mellow whistle.

Baluchistan (*ba-lō'chi-stān*), a country in Asia, the coast of which is continuous with the northwestern seaboard of India, bounded on the north by Afghanistan, on the west by Persia, on the south by the Arabian Sea, and on the east by Sind. It has an area of 132,000 sq. miles, and a population estimated at about 1,000,000; of the districts under British administration, 300,000. The whole country, though portions of it are independent, is officially included in the Empire of India. The general surface of the country is rugged and mountainous, with some extensive intervals of barren sandy deserts, and there is a general deficiency of water. The country is almost entirely occupied by pastoral tribes under semi-independent sirdars or chiefs. The inhabitants are divided into two great branches, the Baluchis and Brahuis, differing in their language, figure, and manners. The Baluchi language resembles the modern Persian, the Brahui presents many points of agreement with the Dravidian languages of India. The Baluchis in general have tall figures, long visages, and prominent features; the Brahuis, on the contrary, have short, thick bones, with round faces and flat lineaments, with hair and

beards frequently brown. Both races are zealous Mohammedans, hospitable, brave, and capable of enduring much fatigue. The Khan of Khelat is nominal ruler of the whole land, and in 1877 concluded a treaty with Britain, in virtue



Baluchis on the Lookout.

of which he became a feudatory of the British monarch. The right had already been secured of occupying at pleasure the mountain passes between Khelat and Afghanistan; but the new treaty placed the whole country at the disposal of the British government for all military and strategical purposes.

Baluster (*bal-us-tér*), a small column or pilaster of various forms and dimensions, often adorned with moldings, used for balustrades.

Balustrade (*bal-us-trād'*), a range of balusters, together with the cornice or coping which they support, used as a parapet for bridges or the roofs of buildings, or as a mere termination to a structure; also serving as a fence or enclosure for altars, balconies, terraces, staircases, etc.

Baluze (*ba-lūz*), ETIENNE, French historian and miscellaneous writer, born in 1630; died in 1718. For more than thirty years he was librarian to M. de Colbert and was appointed professor of

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canon law in the royal college, but displeasing Louis XIV with his *Histoire générale de la maison d'Auvergne*, he was sent into exile and his property confiscated. He succeeded in returning to Paris, but did not regain his position. He left many MSS. and a large number of printed volumes, including *Regum Francorum Capitularia*, 2 vols., and *Miscellanea*, 7 vols.

Balzac (bál-zák), HONORÉ DE, a celebrated French novelist, was born at Tours in 1799; died in 1850. Before completing his twenty-fourth year he had published a number of novels under various *noms de plume*, but the success attending all was very indifferent; and it was not till 1829, by the publication of *Le Dernier Chouan*, a tale of La Vendée, and the first novel to which Balzac appended his name, that the attention of the public was diverted to the extraordinary genius of the author. A still greater popularity attended his *Physiologie du Mariage*, a work full of piquant and caustic observations on human nature. He wrote a large number of novels, all marked by a singular knowledge of human nature and distinct delineation of character, but apt to be marred by exaggeration. Among his best-known works are: *Scènes de la Vie de Province*; *Scènes de la Vie Parisienne*; *Le Père Goriot*; *Eugénie Grandet*; and *Le Médecin de Campagne* ('The Country Doctor'). The publication of this last, 1835, led to a correspondence between Balzac and the Countess Eveline de Hanska (the 'Polish Lady' to whom he dedicated *Modeste Mignon*, 1844), and whom he married fifteen years later. Early in his career he embarked on a number of business ventures which turned out unsuccessfully, and it was largely to pay the debts incurred by these failures that he wrote so voluminously.

Balzac, JEAN LOUIS GUEZ, DE, French writer, born at Angoulême in 1597; died in 1654. He was admitted into the Academy in 1634. He was a powerful rhetorician and a terse writer of prose. His *Letters*, *Prince*, *Socrate Chrétien*, *Entretiens* and *Aristippe* are the best known of his works.

Bamba (bam'ba) a district of the Congo, w. coast of Africa. It is thickly populated, and is rich in gold, silver, copper, salt, etc.

Bambarra (bam-bar'ra), a former negro kingdom of Central Africa, now part of the French Sudan, on the Joliba or Upper Niger, first visited by Mungo Park. The country is generally very fertile, producing wheat, rice, maize, yams, etc. The inhabitants belong to the Mandingo race, and are partly Moham-medans. Excellent cotton cloth is made.

Segou is the principal town. Pop. estimated at 2,000,000.

Bamberg (bam'berg), a thriving town of Bavaria, charmingly situated on several hills, on the navigable river Regnitz, some 3 miles from its mouth in the Main. Pop. 45,308.

Bambino (bam-bé'nô; Ital., an infant), the figure of our Saviour represented as an infant in swaddling clothes. The *Santissimo Bambino* in the church of Ara Coeli at Rome, a richly decorated figure carved in wood, is believed by the people to have a miraculous virtue in curing diseases. *Bambini* are set up for the veneration of the faithful in many places in Catholic countries.

Bambocciades (bam-boch-ädz'), pictures, generally grotesque, of common, rustic, or low life, such as those of Peter Van Laar, a Dutch painter of the 17th century, who on account of his deformity was called *Bamboccio* (cripple). Teniers is the great master of this style.

Bamboo (bam-bô'), the common name of the arborescent grasses belonging to the genus *Bambusa*. There are many species, belonging to the warmer parts of Asia, Africa, and America, and growing from a few feet to as much as 100, requiring much mois-



1. Bamboo (*B. arundinacea*), showing its mode of growth. 2. Flowers, leaves, and stem on a larger scale.

ture to thrive properly. The best-known species is *B. arundinacea*, common in tropical and subtropical regions. From the creeping underground rhizome, which is long, thick, and jointed, spring several

round jointed stalks, which send out from their joints several shoots, the stalks also being armed at their joints with one or two sharp, rigid spines. The oval leaves, 8 or 9 inches long, are placed on short footstalks. The flowers grow in large panicles from the joints of the stalk. Some stems grow to 8 or 10 inches in diameter, and are so hard and durable as to be used for building purposes. The smaller stalks are used for walking-sticks, flutes, etc.; and indeed the plant is used for innumerable purposes in the East Indies, China, and other Eastern countries. Cottages are almost wholly made of it; also, bridges, boxes, water-pipes, ladders, fences, bows and arrows, spears, baskets, mats, paper, masts for boats, etc. The young shoots are pickled and eaten (see *Atchar*), or otherwise used as food; the seeds of some species are also eaten. The substance called *tabasheer* is a siliceous deposit that gathers at the internodes of the stems. The bamboo is imported into Europe and America as a paper material as well as for other purposes.

Bambook (*bam-bōk'*), a country in Western Africa between the Fálémé and Senegal rivers, about 140 miles in length, by 80 to 100 in breadth. It is on the whole hilly and somewhat rugged. The valleys and plains are remarkably fertile, and the country is rich in iron and gold. The natives are Mandingoes, mostly professed Mohammedans, most of whom acknowledge the supremacy of France. Gold and ivory are exchanged for European goods.

Bambook-butter, shea-butter.

Bambusa. See *Bamboo*.

Bamian (*bā-mē-ān'*), a valley and pass of Afghanistan. The valley is one of the chief centers of Buddhist worship and contains two remarkable colossal statues and other ancient monuments. The statues are carved in the cliffs on the north side of the valley. They have been much injured apparently by cannon-shot.

Bamo a. 3). See *Bhamo*.

Bampton Lectures, (*bamp'ton*), a course of lectures established in 1751 by John Bampton, canon of Salisbury, who bequeathed certain property to the University of Oxford for the endowment of eight divinity lectures to be annually delivered. A similar course of lectures, the Hulsean, is annually delivered at Cambridge.

Ban, in political law, is equivalent to excommunication in ecclesiastical. In Teutonic history the *ban* was an edict

of interdiction or proscription: thus, to put a prince under the ban of the empire was to divest him of his dignities, and to interdict all intercourse and all offices of humanity with the offender. Sometimes whole cities have been put under the ban; that is, deprived of their rights and privileges.

Ban, anciently, a title given to the military chiefs who guarded the eastern marches of Hungary, now the title of the governor of Croatia and Slavonia, a division of the kingdom of Hungary. A province over which a ban is placed is called *banat*.

Banana (*ba-na'na*), a plant of the genus *Musa*, nat. order Musaceæ, being *M. sapientum*, while the plantain is *M. paradisiaca*. It is indigenous to the East Indies, and is an herbaceous plant with an underground stem. The apparent stem, which is sometimes as high as 30 feet, is formed of the closely compacted sheaths of the leaves. The leaves are 6 to 10 feet long and 1 or more broad, with a strong midrib, from which the veins are given off at right angles; they are used for thatch, basket-making, etc., besides yielding a useful fiber. The spikes of the flowers grow nearly 4 feet long, in bunches, covered with purple-colored bracts. The fruit is 4 to 10 or 12 inches long, and 1 inch or more in diameter; it grows in large bunches, weighing often from 40 to 80 lbs. The pulp is soft and of a luscious taste; when ripe it is eaten raw or fried in slices. The banana is cultivated in all tropical and subtropical countries, and is a highly important article of food. Manilla hemp is the product of a species of the *Musa* genus.

Bana'na, an African port, belonging to the Congo Free State, situated at the mouth of the river Congo.

Banana-bird, a pretty insessorial bird (*Icterus leucopteryx*), a native of the West Indies and the warmer parts of America. It is a lively bird, easily domesticated, tawny and black in color, with white bars upon the wings.

Banat. See *Ban*.

Ban'bridge, a town of Ireland, s. w. of Belfast, County Down, 22 miles from Belfast, on the Bann. The manufacture of linen is carried on to a great extent in town and neighborhood. Pop. about 5000.

Banbury (*ban'be-ri*), a town of England, in Oxford, long celebrated for its cheese, its cakes, and its ale. Its famous old cross, which existed down to the time of Elizabeth, was destroyed by the Puritans. Pop. 13,463.

Banca (bang'ka), an island belonging to the Dutch East Indies, between Sumatra and Borneo, 157 miles long with a width varying from 8 to 20; pop. 1911, 120,000, a considerable proportion being Chinese. It is celebrated for its excellent tin, of which the annual yield is above 10,000 tons.

Banco (bang'kō), in commerce, a term employed to designate the money in which the banks of some countries keep or kept their accounts, in contradistinction to the current money of the place, which might vary in value or consist of light and foreign coins. The term was applied to the Hamburg bank accounts before the adoption (in 1873) of the new German coinage. The mark banco had a value of about 35 cents; but there was no corresponding coin. See *Bank*.

Bancroft, GEORGE, a historian, born near Worcester, Massachusetts, in 1800. He was educated at Harvard and in Germany, where he made the acquaintance of many literary men of note. In 1824 he published a translation of Heeren's *Politics of Ancient Greece*, and a small volume of poems, and was also meditating and collecting materials for a history of the United States. Between 1834 and 1840 three volumes of this history were published. In 1845 he was appointed Secretary of the Navy, and during his tenure of office established the Naval Academy at Annapolis. He was American ambassador to England from 1846 to 1849, where he enjoyed intimate association with Macaulay and Hallam the historian. He took the opportunity while in Europe to perfect his collections on American history. He returned to New York in 1849, and began to prepare for the press the fourth and fifth volumes of his history, which appeared in 1852. The sixth appeared in 1854, the seventh in 1858, the eighth soon after, but the ninth did not appear till 1866. From 1867 to 1874 he was minister plenipotentiary at the court of Berlin. The tenth and last volume of his great work appeared in 1874. An additional section appeared as a separate work in 1882: *History of the Formation of the Constitution of the United States*. Mr. Bancroft settled in Washington on returning from Germany in 1875, and died January 17, 1891. His works were reprinted in England and translated into Danish, Italian, German and French.

Bancroft, HUBERT HOWE, was born at Granville, Ohio, in 1832, and at the age of twenty started a book store in San Francisco. There he collected on local history a library of sixty thousand volumes and copies of documents which he and assistants used in writing *The Native Races of the Pacific*

States (5 vols.); *History of the Pacific States* (34 vols.); *Chronicles of the Builders of Commonwealths* (7 vols.), and other works.

Ban'croft, RICHARD, born in Lancashire 1544, died 1610, studied at Cambridge, entered the church, and rose rapidly during the reign of Elizabeth till he obtained the see of London in 1597. James I made him Archbishop of Canterbury on the death of Whitgift. He suppressed the Puritans mercilessly, and they in return never ceased to abuse him.

Bandage (ban'dāj), a surgical wrapper of some kind applied to a limb or other portion of the body to keep parts in position, exert a pressure, or for other purpose. To be able to apply a bandage suitably in the case of an accident is a highly useful accomplishment, which, through the teaching of ambulance surgery now so common, may be easily acquired.

Banda (ban'da) ISLANDS, a group belonging to Holland, in the Indian Archipelago, south of Ceram, Great Banda, the largest, being 12 miles long by 2 broad. They are beautiful islands, of volcanic origin, yielding quantities of nutmeg and mace. Goenong Api, or Fire Mountain, is a cone-shaped volcano which rises 2320 feet above the sea. Pop. about 8000.

Bandanna (ban-dan'a), a variety of silk handkerchief having a uniformly dyed ground, usually of bright red or blue, ornamented with white or yellow circular, lozenge-shaped, or other simple figures produced by discharging the ground color.

Banda Oriental. See *Uruguay*.

Bandello (ban-de-l'ō), MATTEO, an Italian writer of *novelle* or tales, born about 1480, died about 1562. He was, in his youth, a Dominican monk, and having been banished from Italy as a partisan of the French, Henry II of France gave him in 1550 the bishopric of Agen. He resided in Agen up to the time of his death, devoting himself largely to literary pursuits which mainly were bent toward the completion of his *novelle*. He also wrote poetry, but his fame rests on his *novelle*, which are in the style of Boccaccio, and have been made use of by Shakespeare, Massinger, and Beaumont and Fletcher.

Bande Noire (bānd nwār), the name given when the Revolution in France had entailed the confiscation of much ecclesiastical property, also many castles and residences of the emigrant and resident nobility, to a number of speculators who bought up the edifices.

etc., in order to demolish them and turn their materials to profit. They were so called on account of their disregard of sacred property, of art, antiquity, and historical associations.

Band-fish, the popular name of fishes of the genus *Cepola*, from their long, flat, thin bodies. *C. rubescens*, a very fragile creature, is sometimes cast up on British shores. Also called *Snake-fish*, *Ribbon-fish*.

Bandicoot (ban'di-küt), the *Mus giganteus*, the largest known species of rat, attaining the weight of 2 or 3 lbs., and the length, including the tail, of 24 to 30 inches. It is a native of India, and is very abundant in Ceylon. Its flesh is said to be delicate and to resemble young pork, and is a favorite article of diet with the coolies. It is destructive to rice fields and gardens.—The name is also given to a family of Australian marsupials. The most common species (*Perameles nasuta*), the long-nosed bandicoot, measures about 1½ feet from the tip of the snout to the origin of the tail, and in general appearance bears a considerable resemblance to a large overgrown rat.

Bandinelli (bān-de-nel'le), BACCIO, an Italian sculptor, born at Florence in 1493; died there in 1560. He was jealous of and strove to rival Michael Angelo. Among his works are a *Hercules and Cacus*, *Christ's body held up by an Angel*, *Adam and Eve*, etc.

Ban'dit, Italian *bandito*, originally an *exile*, banished man, or outlaw, and hence, as persons outlawed frequently adopted the profession of brigand or highwayman, the word came to be synonymous with brigand, and is now applied to members of the organized gangs which infest some districts of Italy, Sicily, Spain, Greece, and Turkey.

Bandoleer (ban'dō-lēr), a large leather belt or baldrick, to which were attached a bag for balls and a number of pipes or cases of wood or metal covered with leather, each containing a charge of gunpowder. It was worn by ancient musketeers and hung from the left shoulder under the right arm with the ball bag at the lower extremity, and the pipes suspended on either side. The name is sometimes given to the small cases themselves, now superseded by cartridges. In modern military equipment a shoulder belt for holding cartridges.

Bandong, or BANDUNG, a town in Java; capital of the province Preanger Regencies. Pop. 21,000.

Bandon, a town of Ireland, County Cork. Pop. 2800.

Bands, a small article of clerical dress made of linen going round the neck and hanging down in front for a short distance in two pieces with square ends, supposed to be a relic of the amice.

Baneberry (bān'ber-i), *Actæa spicata*, a European plant, order *Ranunculaceæ*, local in England, with a spike of white flowers and black, poisonous berries. Two American species are considered remedies for rattlesnake bite.

Baner (bā-nār'), JOHAN GUSTAFSSON, a Swedish general in the Thirty Years' war, born in 1596; died in 1641. He made his first campaigns in Poland and Russia, and accompanied Gustavus Adolphus, who held him in high esteem, to Germany, and commanded the right wing in the memorable battle of Leipzig. After the death of Gustavus in 1632 he was made commander-in-chief of the Swedish army, and in 1634 invaded Bohemia, defeated the Saxons at Wittstock, 24th September, 1636, and took Torgau. He ravaged Saxony again in 1639, gained another victory at Chemnitz, and subsequently, by repeated successes, overran and laid waste a great part of Germany. In the year of his death he nearly took Ratisbon by surprise.

Banff (bamf), county town of Banffshire, Scotland, a seaport on the Moray Firth at the mouth of the Deveron. It is well built, carries on some shipbuilding, and has a rope and sail works, a brewery, etc., with a fishing and shipping trade. On the east side of the Deveron is the town of Macduff, where an extensive fishing trade is carried on. Pop. 7148.—The county has an area of 641 sq. miles. In the south it is mountainous; but the northern part is comparatively low and fertile; principal rivers, the Spey and Deveron; principal mountains, Cairngorm (4095 ft.) and Ben Macdhui (4296 ft.), on its southern boundary. Little wheat is raised, the principal crops being barley, oats, turnips, and potatoes. Fishing is an important industry; as is also the distilling of whisky. Cattle breeding is the principal industry. Serpentine abounds in several places, especially at Portsoy, where it is known as 'Portsoy marble,' and Scotch topazes or cairngorm stones are found on the mountains in the south. Pop. 61,500.

Banff (banf), a station on the Canadian Pacific R. R. in S. W. Alberta and in the Rocky Mountain National Park of Canada. It is a health and pleasure resort with magnificent scenery, a boiling sulphur spring, open air swimming pools, and sanatorium.

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Bang. See *Hashish*.

Bangalore (bang-ga-lôr'), a town of Hindustan, capital of Mysore, and giving its name to a considerable district in the east of Mysore state. The town stands on a healthy plateau 3000 feet above sea-level, has a total area of nearly 14 square miles and is one of the pleasantest British stations in India. In the old town stands the fort, reconstructed by Hyder Ali in 1761, and taken by Lord Cornwallis in 1791. Under English administration the town has greatly prospered in recent times. There are manufactures of silks, cotton cloth, carpets, gold and silver lace, etc. Pop. 189,485. The Bangalore district has an area of nearly 3000 square miles, of which more than half represents cultivable land.

Bangkok, or **BANKOK** (bang-kok'), the capital of the kingdom of Siam extending for several miles on both sides of the Menam, which falls into the Gulf of Siam about 15 miles below. The inner city occupies an island surrounded with walls and bastions, and contains the palace of the king and other important buildings. The dwellings of the common people are of wood or bamboo, often raised on piles; a large portion of the population, however, dwells in boats or wooden houses erected on bamboo rafts moored in the river, and forming a floating town. Temples are numerous and lavishly decorated. Houses in the European style are beginning to be erected, and among other advances recently made are the introduction of the telegraph and telephone, gas, fire-engines, and trolley cars. The trade, both inland and foreign, is very extensive, the exports consisting chiefly of rice, sugar, silk, cotton, tobacco, pepper, sesame, ivory, aromatic wood, cabinet woods, tin, hides, etc.; and the imports consisting chiefly of British cotton, woolen, and other goods. Pop. according to the last census report, 628,675, of whom about a half are Chinese.

Bangles (bang'gls), ornamental rings worn upon the arms and ankles in India and Africa.

Bangor (bang'gor), a city of North Wales, in Carnarvonshire, picturesquely situated near the northern entrance of the Menai Strait. It appears to have possessed a cathedral in the 6th century, though the present cathedral—the third—only dates from the reign of Henry VII. There is also a university college. Since the construction of the Menai bridge Bangor has risen into some importance as a popular re-

sort; its principal trade is in the export of slates from the neighboring quarries. Pop. (1911) 11,237.

Ban'gor, a seaport and watering place of Ireland, County Down, on the south side of Belfast Lough. Principal trade; cotton, linen, and embroideries. Pop. about 5000.

Bangor, seaport, county seat of Penobscot Co., Maine, on Penobscot River, a commercial center with a large trade in lumber, and good railroad and steamer service. It is the site of the fabled city, Norumbega, and was visited by Champlain in 1605. It is the seat of the Bangor Theological Seminary (Congregational), and the University of Maine Law School. Pop. 24,803.

Bangsring. See *Banaring*.

Bangweolo (bang-wê-ô'lo), LAKE, in Central Africa, the south-

ernmost of the great lake reservoirs of the Congo, discovered by Livingstone in 1868, an oval-shaped shallow sheet of water, said to be 150 miles in length along its greater axis from east to west, and about 75 miles in width, but its exact limits are uncertain.

Banian (ban'yan), or **BAN'YAN**, an Indian trader or merchant, one engaged in commerce generally, but more particularly one of the great traders of Western India, as in the seaports of Bombay, Kurrachee, etc., who carry on a large trade by means of caravans with the interior of Asia, and with Africa by vessels. They form a class of the Vaisya caste, wear a peculiar dress, and are strict in the observance of fasts and in abstaining from the use of flesh. Hence—*Banian days*, days in which sailors in the navy had no flesh meat served out to them. *Banian days* are now abolished, but the term is still applied to days of poor fare.

Banian-tree. See *Banyan*.

Banim (bā'nim), JOHN, an Irish novelist, dramatist, and poet, born 1798; died in 1842. His chief early work was a poem, *The Celt's Paradise* (1821). Having settled in London, he made various contributions to magazines and to the stage; but his fame rests on his novels, particularly the *O'Hara Tales*, in which Irish life is admirably portrayed. In these, as in some of his other publications, his brother, Michael Banim (born 1796; died 1874), had an important share, if not an equal claim to praise.

Banishment (ban'ish-ment). See *Exile*.

Banjarmassin (bân-jer-mâs'in), a district and town in the southeast of Borneo, under the government of the Dutch. The town is situated on the Martapura River, about 14 miles above its mouth, in a marshy locality, the houses being built on piles, and many of them on rafts. Exports: pepper, gold dust, precious stones, rattan, dragon's-blood, bird's-nests, etc.; imports: rice, salt, sugar, opium, etc. Pop. about 40,000.

Banjo (ban-jô; a negro corruption of *bandore*, It. *pandora*, from L. *pandura*, a three-stringed instrument),



Banjo.

the favorite musical instrument of the negroes of the southern United States. It has five to nine strings, a body like a tambourine and a neck like a guitar, and is played by stopping the strings with the fingers of the left hand and twitching or striking them with the fingers of the right. The upper or octave string, however, is never stopped.

Banjoemas (bân'yô-mâs), a town in Java, near the center of the island, well built and of commercial importance; it is 22 miles from the coast, and is the residence of a Dutch governor. Pop. about 6000.

Bank, primarily an establishment for the deposit, custody, and repayment on demand of money; and obtaining the bulk of its profits from the investment of sums thus derived and not in immediate demand. The term is a derivative of the *banco* or bench of the early Italian money dealers, being analogous in its origin to the terms *trapezitai* (*trapeza*, a bench or table) applied to the ancient Greek money-changers, and *mensarii* (*mensa*, a table) applied to the public bankers of Rome.

In respect of constitution there is a broad division of banks into public and private; public banks including such establishments as are under any special state or municipal control or patronage, or whose capital is in the form of stock or shares which are bought and sold in the open market; private banks embracing those which are carried on by one or more individuals without special authority or charter and under the laws regulating ordinary trading companies. In respect of function three kinds of banks may be discriminated: (1) banks of deposit merely, receiving and returning money at the convenience of deposi-

tors; (2) banks of discount or loan, borrowing money on deposit and lending it in the discount of promissory notes, bills of exchange, and negotiable securities; (3) banks of circulation or issue, which give currency to promissory notes of their own, payable to bearer and serving as a medium of exchange within the sphere of their banking operations. The more highly organized banks discharge all three functions, but all modern banks unite the two first. For the successful working of a banking establishment certain resources other than the deposits are of course necessary, and the subscribed capital, that is the money paid up by shareholders on their shares and forming the substantial portion of their claim to public credit, is held upon a different footing to the sums received from depositors. It is usually considered that for sound banking this capital should not be traded with for the purpose of making gain in the same way as the moneys deposited in the bank; and it is for the most part invested in government or other securities subject to little fluctuation in value and readily convertible into money. But in any case prudence demands that a *reserve* be kept sufficient to meet all probable requirements of customers in event of commercial crises or minor panics. The reserve of the banking department of the Bank of England is always in coin, or in notes against which an equivalent value of coin and bullion is lying in the issue department. In other English banks the reserve is usually kept partly in gold and partly in government stocks and Bank of England notes; but it sometimes lies as a deposit in the Bank of England. The working capital proper of a bank is constituted by moneys on deposit, for which the bank may or may not pay interest; the advantages of security, of ease in the transmission of payments, etc., being regarded in the cases of banks little affected by competition as a sufficient return to the depositor. Thus the Bank of England pays no interest on deposits, while the contrary practice has prevailed in Scotland since 1729 and is now common in the United States.

Of the methods of making profit upon the money of depositors, one of the most common is to advance it in the discounting of bills of exchange not having long periods (seldom more than 3 months with the national banks) to run; the banker receiving the amounts of the bills from the acceptors when the bills arrive at maturity. Loans or advances are also often made by bankers upon exchequer bills or other government securities, or

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railway debentures or the stock of public companies of various kinds, as well as upon goods lying in public warehouses, the dock-warrant or certificate of ownership being transferred to the banker in security. In the case of a well-established credit they may be advanced upon notes of hand without other security. Money is less commonly advanced by bankers upon mortgages on land, in which the money loaned is almost invariably locked up for a number of years. To banks of issue a further source of profit is open in their note circulation, inasmuch as the bank is enabled to lend these notes, or promises to pay, as if they were so much money and to receive interest on the loan accordingly, as well as to make a profitable use of the money or property that may be received in exchange for its notes, so long as the latter remain in circulation. It is obvious, however, that this interest on its loaned notes may not run over a very extended period, in that the person to whom they are issued may at once return them to the bank to lie there as a deposit and so may actually draw interest on them from the bank of issue; or he may present them to be exchanged for coin, or by putting them at once into circulation may ensure a certain number speedily finding their way back through other hands or other banks to the establishment from which he received them. A considerable number of the notes issued will, however, be retained in circulation at the convenience of the public as a medium of exchange; and on this circulating portion a clear profit accrues. This rapid return of notes through other banks, etc., in exchange for portions of the reserve of the issuing bank, is one of the restraints upon an issue of notes in excess of the ability of the bank to meet them.

In specific relation to his customer the banker occupies the position of debtor to creditor, holding money which the customer may demand at any time in whole or in part by means of a check payable at sight on presentation during banking hours. For the refusal to cash a check from the erroneous supposition that he has no funds of his customer's in his hands, or for misleading statements respecting the position in which the bank stands, the banker is legally responsible. Moreover, the law regards him as bound to know his customer's signature, and the loss falls upon him in event of his cashing a forged check. In their relations to the community, the chief services rendered by banks are the following:—By receiving deposits of money,

and massing in sums efficient for extensive enterprises the smaller savings of individuals, they are the means of keeping fully and constantly employed a large portion of the capital of the community which, but for their agency, would be unproductive; they are the means by which the surplus capital of one part of a country is transferred to another where it may be advantageously employed in stimulating industry; they enable vast and numerous money transactions to be carried on without the intervention of coin or notes at all, thus obviating trouble, risk, and expense.

Although banking operations on a considerable scale appear to have been conducted by the ancients, modern banking must be regarded as having had an independent origin in the reviving civilization of the middle ages. In the twelfth century almost the whole trade of Europe was in the hands of the Italian cities, and it was in these that the need of bankers was first felt. The earliest public bank, that of Venice, established in 1171 and existing down to the dissolution of the republic in 1797, was for some time a bank of deposit only, the government being responsible for the deposits, and the whole capital being in effect a public loan. In the early periods of the operations of this bank deposits could not be withdrawn, but the depositor had a credit at the bank to the amount deposited, this credit being transferable to another person in place of money payment. Subsequently deposits were allowed to be withdrawn, the original system proving inconvenient outside the Venetian boundaries. It was, however, less from the Bank of Venice than from the Florentine bankers of the 13th and 14th centuries that modern banking specially dates, the magnitude of their operations being indicated by the fact that between 1430 and 1433, 76 bankers of Florence issued on loan nearly 5,000,000 gold florins. The Bank of St. George at Genoa also furnished a striking chapter in financial history. The important Bank of Amsterdam, taken by Adam Smith as a type of the older banks, was established in 1609, and owed its origin to the fluctuation and uncertainty induced by the clipped and worn currency. The object of the institution (established under guarantee of the city) was to give a certain and unquestionable value to a bill on Amsterdam; and for this purpose the various coins were received in deposit at the bank at their real value in standard coin, less a small charge for recoinage and expense of management. For the amount deposited a

credit was opened on the books of the bank, by the transfer of which payments could be made, this so-called *bank money* being of uniform value as representing money at the mint standard. It bore, therefore, an *agio* or premium above the worn coin currency, and it was legally compulsory to make all payments of 600 guilders and upwards in bank money. The deposits were supposed to remain in the coffers of the bank, but they were secretly traded with in the 18th century till the collapse of the bank in 1790. Banks of similar character were established at Nuremberg and other towns, the most important being the bank of Hamburg, founded in 1619. In England there was no corresponding institution, the London merchants being in the habit of lodging their money at the Mint in the Tower, until Charles I appropriated the whole of it (£200,000) in 1640. Thenceforth they lodged it with the goldsmiths, who began to do banking business in a small way, encouraging deposits by allowing interest (4d. a day) for their use, lending money for short periods, discounting bills, etc. The bank-note was first invented and issued in 1690 by the Bank of Sweden, founded by Palmstruck in 1688, and one of the most successful of banking establishments. About the same time the banks of England and Scotland began to take shape, opening up a new era in the financing of commerce and industry.

The Bank of England, the most important banking establishment in the world, was projected by William Paterson, who was afterwards the promoter of the disastrous Darien scheme. It was the first public bank in the United Kingdom, and was chartered in 1694 by an act which, among other things, secured certain recompenses to such persons as should advance the sum of £1,500,000 towards carrying on the war against France. Subscribers to the loan became, under the act, stockholders, to the amount of their respective subscriptions, in the capital stock of a corporation, denominated the *Governor and Company of the Bank of England*. The company thus formed, advanced to the government £1,200,000 at an interest of 8 per cent—the government making an additional bonus or allowance to the bank of £4000 annually for the management of this loan (which, in fact, constituted the capital of the bank), and for settling the interest and making transfers, etc., among the various stockholders. This bank, like that of Venice, was thus originally an engine of the government, and not a mere commercial establishment. Its capital

has been added to from time to time, the original capital of £1,200,000 having increased to £14,553,000 (\$72,765,000) in 1800, since which no further augmentation has taken place.

The other English banks consist of numerous joint-stock and private banks in London and the provinces, many of the provincial establishments of both kinds having the right to issue notes. Private banks in London with not more than six partners have never been prevented from issuing notes, but they could not profitably compete with the Bank of England.

Of all other banks, the Bank of France is second in importance only to the Bank of England. It was established in the beginning of the nineteenth century, at first with a capital of 45,000,000 francs, and with the exclusive privilege in Paris of issuing notes payable to bearer, a privilege which was extended in 1848 to cover the whole of France. It has numerous branches in the larger towns, a number of these having been acquired in 1848 when certain joint-stock banks of issue were by government decree incorporated with the Bank of France, the capital of which was then increased to 91,250,000 francs (\$18,250,000) in 91,250 shares of 1000 francs each. In 1857 the capital was doubled, and besides this it has a large surplus capital or rest. Like the Bank of England, it is a bank of deposit, discount, and circulation, and is a large creditor of the state.

The history of banking in the United States properly begins with the establishment of the First Bank of the United States, chartered by Congress in 1791, although a few banks had previously been established by private efforts. The First Bank of the United States, with an authorized capital of \$10,000,000, one-fifth subscribed by the Government, had the power to issue notes which were receivable for all payments to the United States Government. The bank served as agent in Government transactions, and frequently made up deficits in revenues by loans. The Bank was not rechartered in 1811, and its business fell to the state banks, which were eighty-eight in number at that time. These banks rapidly multiplied, but were often constructed on such unsound principles, that they gained the name of 'wild cat' banks. Sometimes the amount of currency was twice and even three times the amount of capital. In the meantime the Second Bank of the United States had been established in 1815, with a fixed capital of \$35,000,000, one-fifth subscribed by the Government. This, too, failed to receive a new charter after the expiration of twenty years.

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provement in banking methods and the bank note circulation shrank from \$149,000,000 in 1837 to \$58,000,000 in 1848. In 1863 Congress enacted a law authorizing the formation of a system of banks under federal charter. This act was re-cast in an act of June 3, 1864, upon which the national banking system rested for nearly fifty years. Every bank chartered under the act was required to invest a certain proportion of its capital in United States registered bonds, at least 25 per cent. if the capital exceeded \$150,000, 33-1-3 per cent. if less. No bank was originally permitted to be organized with a capital of less than \$50,000; but this provision was amended in 1900 to permit the organization of banks with a capital of less than \$25,000 in towns having a population of not more than 3000. On March 3, 1865, a tax of 10 per cent. per annum was enforced on all issues of state banks outstanding after July 1, 1866; and many state banks thereafter were re-organized as national banks or ceased issuing notes. The Act of 1900 permitted banks to issue notes to the par value of bonds deposited in the United States treasury, instead of to 90 per cent. value as originally. The limit of the total circulation of the country to \$300,000,000 was early abandoned; and the removal of the restriction led to the establishment of more and more banks. The increased use of checks later caused a steady decrease in the amount of bills in circulation, while the high price of U. S. bonds so reduced the interest as to make it unprofitable to hold them as a reserve to secure circulation.

While the national bank currency combined the advantages of uniformity with security to the noteholder, it proved too inelastic to meet the needs of expanding business. The currency bill passed by the Democratic administration of President Wilson, December 23, 1913, provided, broadly speaking, for a return to the original system of a Government-controlled bank, providing for Federal reserve banks (not fewer than eight or more than twelve), controlled by a body of seven men selected by the President, including the Secretary of the Treasury and the Comptroller of the Currency, members *ex-officio*.

The bill further provided: (1) that each reserve bank should have a capital as large as should be required, and not less than \$4,000,000, this capital to be subscribed by the national banks (each to purchase stock to the amount of 6 per cent. of its combined capital and surplus or to forfeit its national charter), offered at par in shares of \$100 to the public, or, both of these sources of capital failing, purchased by the United States; (2) that

each should have nine directors—three bankers, to be chosen from among the bankers themselves, three, not bankers, to be chosen by the bankers in the district, but representing the agricultural interests of the district, and three to be selected by the Federal Board in Washington; (3) that the banks should be simply reserve banks, issuing money (bank notes in denominations of \$5 and upward, to be legal tender and accepted for the payment of any debt), but not dealing directly with the public; and (4) that they should be depositories for the nation's cash. National banks for fifty years had issued notes based upon United States Government bonds; but now Federal bank notes must be based upon two-name commercial paper, discounted previously by individual banks. Behind each note there must be 100 per cent. of such paper and an additional gold reserve of 40 per cent. From its seat in Washington the Federal Reserve Board controls the Federal reserve banks and through them the national banks throughout the United States. A distinctive feature of the new system is that any bank not located in any of the existing fifty reserve or central reserve cities, may lend money on farm property up to 50 per cent. of its capital—such loans to be made for a period not longer than five years.

Since 1861 post-office savings-banks have been in operation in Britain; the deposit paid over to the Commissioners of the Reduction of the National Debt, who allow interest at 2½ per cent. per annum. A similar bill was passed by Congress in 1910, interest being fixed at 2 per cent, and the limit of deposit as \$500. France, Austria, Germany, Canada and other countries have also adopted similar savings-banks.

Savings-banks began to attract attention in the United States shortly after their inauguration in England, the first being organized in New York in 1816, but the first one to go into practical operation was in Philadelphia in the same year. Boston was the first to have an incorporated savings-bank, this being effected Dec. 13, 1816, business being begun in 1817; the United States thus anticipated Britain in throwing about these banks the protection and sanction of law. From that time these examples have been rapidly followed. No uniform plan of organization for these banks exists. In some States there is a large number of incorporators who elect trustees and directors from among their members; in others the incorporators are limited in number and are themselves the trustees and managers. In the Northeast trustees manage the savings-banks

for the depositors; elsewhere they are mostly under the control of corporations with capital stock.

The original theory of savings-banks was that the earnings, after the repayment of expenses, should be ratably distributed among the depositors. Afterward this was supplemented by the reserving of a sum for the meeting of any losses which might occur, begetting a surplus as security. Still later has grown a practice of paying a given rate of interest, but this is a departure from the real principle of savings-banks. Many of these institutions give a further dividend in addition to the stated interest, according as the dividend term has been prosperous or otherwise. In general the deposits, though there is much diversity in the several States, are invested in real estate securities, United States bonds, the stock of corporations of unquestioned credit, the bonded obligations of cities and railroads and other securities and on loans thereon. In most of the States there is legal restriction on the amounts which may be deposited, but these are generally loosely enforced.

In Canada and Australia the bank system is largely under government management, and this is especially the case in New Zealand, although these countries also have a number of private institutions, all of which, however, are subject to stringent laws. A number of the ordinary banks also perform to a large degree the functions of savings-banks.

In France the savings-banks system arose in 1818, but it was not until 1835 that the banks were regulated by law. Since that time their advancement has been rapid, and enormous amounts now stand on deposit, the postoffice savings banks doing the greater share of the business.

There are also dime savings-banks. School savings-banks, besides, have been largely introduced through the United States, and much good has resulted by the teaching of thrift among scholars. There are other institutions in many of the large cities which promote savings by giving a considerable bonus if the deposits are allowed to remain for a certain period, but these, of course, are charitable institutions and not within the scope of this article.

An important feature in connection with the banking system is that of the *clearing-house*, which, in the United States, was first put in operation in New York, Oct. 11, 1853. Since that time this plan has been adopted in every important money center and city. Each

bank in its daily dealings receives large amounts of, and checks on, other banks; thus, at the close of the day's business each one has various sums due it to other banks; it is likewise the debtor of other banks who have received bills, checks, and drafts drawn upon it. The settlement by means of the clearing-house is simultaneously and quickly effected, the banks now having no direct business with each other save through this medium, which enables them to settle with each other every day. The close relation between the several banks thus instituted enables them to act in concert in times of financial stress.

In 1861 it is doubtful if the government could have effected the necessary loans at the outbreak of the Civil War but for the aid of the banks of New York. Certainly without the Clearing-house Association the banks could not have furnished the funds which established the credit of the United States and enabled it to negotiate its bonds to the enormous amount of \$2,000,000,000.

A record is kept by the clearing-house staff of the daily transactions of each bank, together with a statement of the loans, specie, deposits, legal tender and circulation made weekly to the manager of the clearing-house; thus the condition of each bank can be accurately estimated. See *Clearing-house, Postal Savings Banks*.

Banking. An amendment to the federal reserve act permits the board to authorize the banks to purchase acceptances in quantities more than 50 per cent., but not more than 100 per cent. of the capital and surplus of the banks. The previous regulations limited the amount to 50 per cent.

Banko-ware (ban'ko-wär), a Japanese pottery made near Kuwana. It is very light, and is made in molds of irregular shapes and decorated with enamel colors, etc.

Bankrupt (bank'rapt; from *It. banca*, a bench, and *Lat. ruptus*, broken, in allusion to the benches formerly used by the money-lenders in Italy, which were broken in case of their failure), a person whom the law does or may take cognizance of as unable to pay his debts. Properly it is of narrower signification than *insolvent*, an insolvent person simply being unable to pay all his debts. In England up till 1861 the term bankrupt was limited to an insolvent trader, and such traders were on a different footing from other insolvent persons, the latter not getting the same legal relief from their debts. In all civilized communities laws have been passed regarding bankruptcy. At present bank-

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ruptcy in England is regulated by the Bankruptcy Act of 1883, which has as its essential feature the intervention of the Board of Trade at all stages of the bankruptcy, with the object of obtaining full official supervision and control.

Though imprisonment for debt has been abolished, fraudulent bankrupts may be punished, and the conduct of prosecutions for offenses arising out of any bankruptcy proceeding fall to the public prosecutor. The estates of persons dying insolvent may be administered according to the law of bankruptcy.

In the United States, by an act approved July 1, 1898, a national Bankruptcy Law is in effect. It much resembles the English law, except that referees are substituted for receivers and are appointed by the court having jurisdiction in the district. All U. S. District Courts are constituted Courts of Bankruptcy. A person may file a petition for voluntary bankruptcy, if his debts amount to one thousand dollars. Creditors may file a petition for involuntary bankruptcy against a debtor and on the latter rests the onus of defense in proving his solvency. In such a case the debtor can claim the right of a trial by jury. The referee shall declare dividends and furnish lists to whom such are payable, to the trustee, the latter having possession of the estate in liquidation and being also a court appointee. Meetings of creditors are to be called by the court to be held in not less than 10 nor more than 30 days after adjudication, and at which meeting the bankrupt shall be present.

Banks, SIR JOSEPH, a distinguished naturalist, born at London in 1743. After studying at Harrow and Eton he went to Oxford in 1760, and formed there amongst his fellow-undergraduates a voluntary class in botany, etc. He was chosen a member of the Royal Society in 1766, and soon after went to Newfoundland and Hudson Bay to collect plants. In 1768, with Dr. Solander, a Swedish gentleman, pupil of Linnaeus, and then assistant librarian at the British Museum, he accompanied Cook's expedition as naturalist. In 1772 he visited Iceland along with Dr. Solander, and during this voyage the Hebrides were examined, and the columnar formation of the rocks of Staffa first made known to naturalists. In 1778 Banks was chosen president of the Royal Society, in 1781 was made a baronet, and in 1795 received the order of the Bath. He wrote only essays, papers for learned societies, and short treatises. He died 1820, and bequeathed his collections to the British Museum.

Banks, THOMAS, an English sculptor, born in 1733, died in 1803. He studied sculpture in the Royal Academy, and in Italy, where he executed several excellent pieces, particularly a bas-relief representing *Caractacus brought prisoner to Rome*, and a *Cupid catching a Butterfly*, the latter work being afterwards purchased by the Empress Catharine. On leaving Italy he spent two unsatisfactory years in Russia, and then returned to England, where he was soon after made an academician. Among his other works was a colossal statue of *Achilles Mourning the Loss of Briseis*, in the hall of the British Institution, and the monument of Sir Eyre Coote in Westminster Abbey.

Banks, NATHANIEL PRENTISS, soldier and statesman, born at Waltham, Massachusetts, in 1816. Elected to the State legislature in 1849 and to Congress in 1852, he was made speaker of the House in 1856, and elected governor of Massachusetts in 1857, being twice re-elected. In 1861 he was made major-general of volunteers in the Civil War, and in 1862 was appointed commander of the Department of the Gulf. He captured Port Hudson in 1863, but an expedition against Shreveport, on the Red River, in 1864, proved a failure. He was subsequently a member of Congress from 1865 to 1877, 1888-91. He died in 1894.

Banksia (bank'si-a), a genus of the *Proteaceæ*, an Australian order of plants, named in honor of Sir Joseph Banks. While chiefly shrubs, a few species are small trees. They have hard, dry leaves, white or very pale green beneath, while the branches bear at their ends oblong heads of flowers, grouped in great numbers, and secreting much honey. They are abundant in all parts of Australia, called there Honeysuckle trees, and forming a characteristic feature of the vegetation.

Banksring. See *Banaring*.

Bank-Swallow, a common bird of Europe, Asia and America, family *Hirundinidæ*; so called from its habit of burrowing into banks to build its nest.

Bankura (ban-kö'ra), a town of Bengal, on the Dhalkisor River, healthy and with a considerable trade. Pop. about 20,000.

Bann, UPPER and LOWER, two rivers rising in the mountains of Mourne, County Down, and after flowing 33 miles in a N. direction, falling into Lough Neagh; the latter being the outlet of Lough Neagh, and falling into the Atlantic Ocean 4 miles below Coleraine, after a course of nearly 40 miles.

Ban'ner, a piece of drapery, usually bearing some warlike or heraldic device or national emblem, attached to the upper part of a pole or staff, and indicative of dignity, rank, or command. Heraldically it is a square or quadrangular flag which varies in size with the rank of its possessor; and it is sometimes used specifically to denote an ensign, the attached edge of which is maintained in a horizontal position, as distinguished from the flag, which is fastened vertically to an upright.

Banneret (ban'er-et), formerly, in England, a knight made on the field of battle as a reward for bravery, with the ceremony of cutting off the point of his pennon and making it a banner.

Bannock (ban'ok), a cake made of oatmeal, barleymeal, or pease-meal baked on an iron plate or griddle over the fire. From a supposed resemblance the turbot is sometimes called in Scotland the *Bannock-fluke*.

Bannockburn (ban'ok-burn), a village of Scotland, in Stirlingshire, 2 miles S. E. of Stirling, famous for the decisive battle in which King Robert Bruce of Scotland defeated Edward II of England, on the 24th June, 1314. It has manufactures of woollens, such as tartans, carpets, etc. Pop. 3374.

Banns of Matrimony, public notice of the intended celebration of a marriage given either by proclamation, *viva voce*, by a clergyman, session-clerk, or precursor in some religious assembly, or by posting up written notice in some public place.

Bannu (bän'nö), district in the Punjab, Hindustan, on the northwestern frontier; area, 1680 miles; pop. 235,000, largely Mohammedans.

Banquette (bang-ket'), in fortification, the elevation of earth behind a parapet, on which the garrison or defenders may stand. The height of the parapet above the banquette is usually about 4 feet 6 inches; the breadth of the banquette from $2\frac{1}{2}$ or 3 feet to 4 or 6 feet according to the number of ranks to occupy it. It is frequently made double, that is, a second is made still lower.

Bans. See *Banns*.

Banshee (ban'shë), *BENSHI'*, a phantom hag believed in Ireland and some parts of Scotland to attach herself to a particular house, and to appear or make her presence known by wailing before the death of one of the family.

Bantam, a residency occupying the whole of the W. end of the island of Java. It formed an independ-

ent kingdom, governed by its own sultan, till 1683, and the Dutch exercised suzerainty with brief intermission until its formal incorporation by them at the beginning of the last century. It produces rice, coffee, sugar, cinnamon, etc. Serang is its capital. The town Bantam was the first Dutch settlement in Java (1595), and for some time their principal mart, though now greatly decayed.

Banteng (ban-teng'; *Bos Banteng* or *Sondacijs*), a wild species of ox, native of Java and Borneo, having a black body, slender white legs, short sleek hair, sharp muzzle and the back humped behind the neck.

Banting System, a course of diet for reducing superfluous fat, adopted and recommended in 1863 by W. Banting, of London. The diet recommended was the use of butcher's meat principally, and abstinence from beer, farinaceous food, and vegetables.

Bantry, a small seaport town near the head of Bantry Bay, County Cork, Ireland.—The bay, one of three large inlets at the S. W. extremity of Ireland, affords an unsurpassed anchorage, and is about 25 miles long by 4 to 6 broad, and from 10 to 40 fathoms deep, with no dangerous rocks or shoals.

Bantu (bän-tö'), the ethnological name of a group of African races below about 6° N. latitude, and including the Kaffirs, Zulus, Bechuanas, the tribes of the Loango, Congo, etc., but not the Hottentots.

Banville (ban-vël') *THEODORE FAUL-LAIN DE*, French poet and miscellaneous writer, was born in the Bourbonnais in 1823, the son of a naval officer. He received his education at a lycée in Paris, and on leaving school gave himself up to literature. In 1842 he published *Les Variétés*, and this, followed in 1846 by *Les Stalactites*, won him a place in the literary world. He wrote a number of plays and was identified with Parisian journalism. Died in 1891.

Banxring (banks'ring; genus *Tupaia*), a quadruped belonging to the *Insectivora*, inhabiting the Indian Archipelago, bearing some resemblance externally to a squirrel, but having a long, pointed snout. It lives among trees, which it ascends with great agility.

Banyan, or *BAN'IAN* (*Ficus Indica*), a tree of India, of the fig genus. A remarkable characteristic of this tree is its method of throwing out from the horizontal branches supports which take root as soon as they reach the ground, enlarge into trunks, and, extending branches in their turn, in time cover a prodigious extent of ground. A cele-

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brated banyan-tree has been known to shelter 7000 men beneath its shade. The wood is soft and porous, and from its white glutinous juice bird-lime is sometimes prepared. Both juice and bark are regarded by the Hindus as valuable medicines.

Baobab (ba'ô-bab; *Adansonia digitata*, or MONKEY-BREAD TREE, a tree belonging to the natural order (or suborder) Bombaceae, and the only known species of its genus, which was named after the naturalist Adanson. It is one of the largest of trees, its trunk sometimes attaining a diameter of 80 feet; and as the profusion of leaves and drooping boughs sometimes almost hides the stem, the whole forms a hemispherical mass of verdure 140 to 150 ft. in diameter and 60 to 70 ft. high. It is a native of Western Africa, and is found also in Abyssinia; it is cultivated in many of the warmer parts of the world. The roots are of extraordinary length, a tree 77 feet in girth having a tap-root 110 feet in length. The leaves are deep green, divided into five unequal parts lanceolate in shape, and radiating from a common center. The flowers resemble



Baobab Tree (*Adansonia digitata*).

the white poppy, having snowy petals and violet-colored stamens; and the fruit, which is large and of an oblong shape, is said to taste like gingerbread, with a pleasant acid flavor. The wood is pale-colored, light, and soft. The tree is liable to be attacked by a fungus, which, vegetating in the woody part, renders it soft and pithlike. By the negroes of the west coast these trunks are hollowed into chambers, and dead bodies are suspended in them. There they become perfectly dry and well preserved, without further preparation or embalming. The baobab is emollient and mucilaginous; the pulverized leaves constitute *lalo*, which the natives mix with their daily food to

diminish excessive perspiration, and which has been used by Europeans in fevers and diarrheas. The expressed juice of the fruit is used as a cooling drink in putrid fevers, and also as a seasoning for various foods.

Baphomet (ba'ô-met), the imaginary idol or symbol which the Templars were accused of employing in their mysterious rites, and of which little or nothing is known.

Baptism (bap'tizm; from the Greek *baptizô*, from *baptô*, to immerse or dip), a rite which is generally thought to have been usual with the Jews even before Christ, being administered to proselytes. From this baptism, however, that of St. John the Baptist differed, because he baptized Jews also as a symbol of the necessity of perfect purification from sin. Christ himself never baptized, but directed his disciples to administer this rite to converts (Matt., xxviii, 19); and baptism, therefore, became a religious ceremony among Christians, taking rank as a sacrament with all sects which acknowledge sacraments. In the primitive church the person to be baptized was dipped in a river or in a vessel, with the words which Christ had ordered, generally adopting a new name more fully to express the change. Sprinkling, or, as it was termed, *clitic* baptism, was used only in the case of the sick who could not leave their beds. The Greek Church and Eastern schismatics retained the custom of immersion; but the Western Church adopted or allowed the mode of baptism by pouring or sprinkling, since continued by many Protestants. This practice can be traced back certainly to the third century, before which its existence is disputed. Since the Reformation there have been various Protestant sects called Baptists, holding that baptism should be administered only by immersion, and to those who can make a personal profession of faith. The Montanists in Africa baptized even the dead, and in Roman Catholic countries the practice of baptizing church-bells—a custom of tenth-century origin—continues to this day. Being an initiatory rite, baptism is only administered once to the same person. The Roman and Greek Catholics consecrate the water of baptism, but Protestants do not. The act of baptism is accompanied only with the formula that the person is baptized in the name of the Father, Son, and Holy Ghost; but, among most Christians, it is preceded by a confession of faith made by the person to be baptized if an adult, and by his parents or sponsors if he be a child. The Roman

Catholic form of baptism is far more elaborate than the Protestant. This church teaches that all adults not baptized are damned, even unbaptized infants are not admitted into heaven; but for those with whom the absence of baptism was the chief fault, even St. Augustine himself believed in a species of mitigated damnation. Protestants hold that though the neglect of the sacrament is a sin, yet the saving new birth may be found without the performance of the rite which symbolizes it. Naming the person baptized forms no essential part of the ceremony, but has become almost universal, probably from the ancient custom of renaming the catechumen.

Baptistry (bap-tis'tér-i), a building or a portion of a building in which is administered the rite of baptism. In the early Christian Church the baptistry was distinct from the basilica or church, but was situated near its west end, and was generally circular or octagonal in form, and dome-roofed. About the end of the sixth century the baptistry began to be absorbed into the church, the font being placed within and not far from the western door. Some detached baptisteries still remain in use, as those of St. John Lateran, Rome, at Pisa, Parma, Ravenna, Florence, etc., that of Florence being 108 feet in diameter externally, and richly decorated. Baptisteries were dedicated to St. John the Baptist.

Baptists (bap'tists), a Protestant denomination of Christians, so-called because of their distinctive views of baptism. Regarding the church as a completely spiritual institution, they maintain that membership, and therefore baptism, should be confined to believers only. Infants in the Baptist church are therefore not baptized. They further maintain that immersion is the correct mode of administering baptism. In the matter of communion Baptists hold differing views, some receiving Protestants of other denominations to the Lord's table, others refusing the privilege. Most of them hold the doctrine of Calvinism in a modified form; but the present tendency, especially in Great Britain is to recognize no other limitation to salvation than that which results from the exercise of man's free will. The form of church government is congregational. They maintain that each church is a spiritual democracy, possessed of the power of self-government under its exalted head, Jesus Christ, that the only officers of a New Testament church are pastors (otherwise called elders and bishops) and deacons, and that discipline should be exercised only with the consent of the members of the church. Although

Baptist associations and conventions exist they have no legislative or judicial function. The Baptist World Alliance was organized in 1905. Historically the modern Baptist movement dates from 1606 or 1607 when John Smyth with a small number of Separatists fled from England to Holland to escape persecution. In 1611 with Thomas Helwys and others Smyth formed the first English Baptist church. The next year Helwys returned with his followers to England and founded another church there. Other churches sprang up, and in 1633, the first Particular or Calvinistic Baptist church was organized. This and succeeding churches of the same sort joined in issuing a Confession of Faith, in which they set forth their Calvinistic doctrine of predestination and defined baptism as the 'dipping or plunging of the body in water.' The following century was one of dissension and slow growth, but in 1770 the New Connection of General Baptists was formed, and in 1792 the English Baptist Missionary Society. Finally in 1832 the General and Particular Baptists united for missionary and educational purposes in the Baptist Union, and in 1891 a complete union was effected. In America the first Baptist church was founded in Providence, Rhode Island, by Roger Williams in 1638. About 1644 a second church was established in Newport; in 1655 the First Baptist Church of Boston was organized; in 1683 or 1684 Baptist refugees from New England founded the first church in the South, near Charleston, South Carolina; by 1740 there were Baptist churches in all the colonies; and from that time the denomination increased rapidly. In 1812 the Baptist Education Society was organized; in 1814 the Foreign Missionary Society; in 1824 the Publication Society; and in 1832 the Home Mission Society. In 1845 the Southern Baptists withdrew from the general union for missionary purposes and formed the Southern Baptist Convention. In 1880 the negro Baptists withdrew and formed the National Baptist Convention. The German, Swedish and Dano-Norwegian Baptist churches also have separate conferences. There are besides the Regular Baptists in the United States other denominations holding essentially Baptist doctrines. They include the *Free Baptists*, formerly the *Free Will Baptists*, originating in New Hampshire in 1780 as an anti-Calvinistic, 'open communion' body, but uniting in 1911 with the Regular Baptists for missionary and other interests; the *Free Will Baptists*, a small body in North and South Carolina, separated from the Regular Baptists in 1750 when the latter adopted Calvinistic doctrines; the *General Sea-Principle Baptists*, a small body

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represented in Massachusetts, Rhode Island and Pennsylvania, organized in 1670; the *Seventh Day Baptists*, observing Saturday as the Sabbath, were known in England as early as the 16th century and first represented in America in 1671; the *General Baptists*, differing but little from the Regular Baptists, but holding that the Atonement is general and not for the elect alone; the *Separate Baptists* allied in doctrine to the Free Baptists, the great majority of whom are now reunited with the Regular Baptists; the *United Baptists*, formed by the union of certain Separate and Regular Baptist churches, retaining the practice of foot-washing and 'close communion'; the *Baptist Church of Christ*, found only in the South, practicing foot-washing as an ordinance and claiming to be the oldest Baptist organization; the *Calvinistic Primitive Baptists*, also known as 'Old School,' 'Anti-Mission,' and 'Hard-Shell,' originating about 1833 in the South, practicing foot-washing and rejecting the institutions of Sunday school and missions as unscriptural; the *Old Two-Seed-in-the-Spirit Predestinarian Baptists*, holding to a strict Calvinism. In 1913 there were in the United States 5,563,000 Regular Baptists; 37,000 Primitive Baptists, and a total of 5,894,000 members of all Baptist bodies.

Baraboo (bā'rā-bō), a city of Wisconsin, county seat of Sauk Co., 37 miles N. W. of Madison. It has factories, railroad shops, etc. Pop. 6324.

Baraguet-d'Hilliers (bā-rā-gā-dē-lyā), LOUIS, a distinguished French general under the first empire, born in Paris 1764. He served in the army of Italy, and in Egypt, Germany, and Spain; and in the Russian campaign of 1812 commanded a division. He was entrusted with the direction of the vanguard in the retreat, but was compelled to capitulate. Napoleon ordered him to return to France as under arrest, but he died at Berlin on the way, Jan. 6, 1813.

Barbadoes, or BARBADOS (bar-bā'dos), the most eastern of the West India Islands, first mentioned in 1518, and occupied by the British in 1625. Length 21 miles, breadth 13; area, 106,470 acres or 166 sq. miles; mostly under cultivation. It is divided into eleven Church of England parishes; capital, Bridgetown. It is more densely peopled than almost any spot in the world, the population now being about 200,000 or about 1200 to the square mile. The climate is pleasant, the heat being moderated by the trade-winds; but the island is subject to dreadful hurricanes. The surface is broken, now without forests, and

with few streams; the highest point is 1104 feet above the sea-level. There is a thick surface deposit of coral rock and the island is evidently an uplifted coral reef. There are few indigenous mammals or birds. The black lowland soil gives great returns of sugar in favorable seasons. The chief exports, besides sugar, are molasses and rum; imports: rice, salt meat, corn, butter, flour, etc. Barbadoes has a considerable transit trade, being in some measure the central mart for all the Windward Islands. It is the see of a bishop and the headquarters of the British Agricultural Department. There is a railway across the island, also street-cars, telephones, etc. The island forms a distinct government under a governor, an executive and a legislative council, and a house of assembly. Liberal provision is made for education both by old foundations and by annual vote.

Barbadoes Cherry, the pleasant tart, fleshy fruit of *Malpighia puniceifolia*, a West Indian tree 15 ft. high.

Barbadoes Gooseberry, the fruit of *Pereskia Pereskia*, a West Indian species of cactus.

Barbadoes Leg, a form of elephantiasis chiefly affecting the legs.

Barbara (bar'ba-ra), St., according to the legend, belonged to Nicomedia, in Asia Minor, and was beheaded by her father for having become a Christian, he being immediately thereafter struck dead by lightning. She is invoked in storms, and is considered the patron saint of artillerymen.

Barbarelli (bar-ba-rel'i). See *Gior-gione*.

Barbarian (bar-bā'ri-an; Greek, *bar-baros*), a name given by the Greeks, and afterwards by the Romans, to every one who spoke an unintelligible language; and hence coming to connote the idea of *rude, illiterate, uncivilized*. This word, therefore, did not always convey the idea of something odious or savage; thus Plautus calls Nævius a barbarous poet, because he had not written in Greek; and Cicero terms illiterate persons without taste 'barbarians.'

Barbarossa (bar-ba-ros'a; Italian, 'red-beard'), a surname given to Frederick I of Germany.

Barbarossa ('red-beard'), the name of two famous Turkish corsairs of the sixteenth century, who ravaged the shores of the Mediterranean and established themselves in Algiers. The elder of the brothers, Aruch or

Horuk, was killed in 1518; the younger and more notorious, Khair-ed-Din, who captured Tunis, died in 1546.

Barbaroux (bâr-bâ-rô'), CHARLES JEAN MARIE, noted French revolutionist, born 1767. Notable among other things as having instigated the march of the battalion of Marseillais to Paris. Voted for the death of Louis XVI. Was guillotined at Bordeaux in 1794.

Barbary (bar'ba-ri), a general name for the most northerly portion of Africa, extending about 2800 miles from Egypt to the Atlantic, with a breadth varying from about 140 to 550 miles; comprising Morocco, Algeria, Tunis, and Tripoli (including Barca and Fezzan). The principal races are: the Berbers, the original inhabitants, from whom the country takes its name; the Arabs, who conquered an extensive portion of it during the times of the Caliphs; the Bedouins, Jews, Turks, and the French colonists of Algeria, etc. The country, which was prosperous under the Carthaginians, was, next to Egypt, the richest of the Roman provinces, and the Italian states enriched themselves by their intercourse with it. During the 16th century, however, it became infested with adventurers who made the name of Barbary corsair a terror to commerce, a condition of things finally removed by the resistance of the American fleets and the French occupation of Algeria.

Barbary Ape (*Inuus ecaudatus*), a species of ape, or tailless monkey, with yellowish-brown hair, of the size of a large cat, remarkable for docility; also called the *magot*. It is common in Barbary and other parts of Africa, and has been carefully protected on Gibraltar Rock, being the only European monkey, though probably not indigenous. It has been the 'showman's ape' from time immemorial.

Barbastro (bar-bas'trô'), a city of Aragon, Spain, province of Huesca, 50 miles N. E. of Saragossa, with an interesting cathedral, and some trade and manufactures. Pop. 7033.

Barbault (Fr. pron. bar-bô'), ANNA LETITIA, an English poet and general writer, was born in Leicestershire 1743, daughter of a Presbyterian minister named Aikin. In 1774 she married the Rev. Rochemont Barbault. Her *Early Lessons and Hymns for Children*, and various essays and poems, won considerable popularity. She edited a collection of English novels, with critical and biographical notices, and some other works. Her last long poem, *Eighteen Hundred and Eleven*, appeared in 1812. She died at Stoke-Newington, 1825.

Barbel (bâr'bel), a genus (*Barbus*) of fresh-water fishes of the carp family, distinguished by the four fleshy filaments growing from the lips, two at the nose and one at each corner of the mouth, forming the kind of beard to which the genus owes its name. Of the several species the European *Barbus vulgaris*, common in most rivers, has an



Barbel (*Barbus vulgaris*).

average length of from 12 to 18 inches, and in form and habits strongly resembles the pike. Its body is elongated and rounded, olive-colored above and bluish on the sides, and covered with small scales. The upper jaw, which is much longer than the lower, forms a snout, with which it bores into the mud for worms, insects, aquatic plants, etc. It weighs from 9 to 20 pounds. It gives good sport to the angler, but its flesh is very coarse, and at the time of spawning the roe is dangerous to eat.

Barber, one whose occupation is to shave or trim the beard and to cut and dress hair. The practice of surgery was formerly a part of the craft, and by an act of Henry VIII, the Company of Barbers was incorporated with the Company of Surgeons—the company being then known as the Barber-surgeons—with the limitation, however, that the surgeons were not to shave or practise 'barbery,' and the barbers were to perform no higher surgical operation than blood-letting and tooth-drawing. This continued till the time of George II. The signs of the old profession—the pole which the patient grasped, its spiral decoration in imitation of the bandage, and the basin to catch the blood—are still sometimes retained. The barbers' shops, always notorious for gossip, were in some measure the news-centers of classic and mediæval times.

Barberini (bâr-be-rê-nê), a celebrated Florentine family, which, since the pontificate of Maffeo Barberini (Urban VIII, 1623 to 1644), has occupied a distinguished place among the nobility of Rome. During his reign he seemed chiefly intent on the aggrandizement of his three nephews, of whom two

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Barberry

were appointed cardinals, and the third Prince of Palestrina.

Barberry (bār'bēr-i), a genus of shrubs, order Berberidaceae, the common barberry (*Berberis vulgaris*) having bunches of small beautiful red berries, somewhat oval; serrated and pointed leaves; thorns, three together, upon the branches; and hanging clusters of yellow flowers. The berries nearly approach the tamarind in respect of acidity, and when boiled with sugar make an agreeable preserve, rob, or jelly. They are also used as a dry sweetmeat, and in sugar-plums or comfits; are pickled with vinegar, and are used for the garnishing of dishes. The bark is said to have medicinal properties; the roots yield a yellow dye, used in working morocco leather. The shrub was originally a native of eastern countries, but it is now generally diffused in Europe, as also in North America. In England it has been almost universally banished from hedgerows, from the belief that it causes rust on wheat—a supposition supported by the fact that it is subject itself to attacks of a sort of epiphyte. Numerous other species belong to Asia and America.

Barberton (bār'ber-tun), the chief mining center of De Kaap gold fields, Transvaal, about 80 miles from Lydenburg, and 150 to 160 from Delagoa Bay. It had formerly a pop. of about 7000, but the opening of the Rand mines has caused its decline to about 2000.

Barbet (bār'bet), a family (*bucconidae*) of climbing birds with a thick, conical beak, having tufts of bristles at its base. Their wings are short and their flight somewhat heavy. They have been divided into three subgenera:—The *barbicans* (*Pogonias*), inhabiting India and Africa, and feeding chiefly on fruit; the *barbets* proper (*Bucco*), found in Africa and America, and nearly related to the woodpeckers; and the *puff-birds* (*Tamatia*), inhabiting America and feeding on insects. The name is given also to a kind of poodle dog.

Barbette (bār'bet'), an elevation of earth behind the breastwork of a fortification, from which the artillery may be fired over the parapet instead of through an embrasure. A barbette carriage is a carriage which elevates a gun sufficiently high to permit its being fired over the parapet.

Barbeyrac (bār-bā-rāk), JEAN, an able French writer on jurisprudence and natural law, translator of Grotius and Cumberland, and translator and annotator of Pufendorf.

Barbour

Born 1674; professor of law at Lausanne and Groningen; died 1744.

Barbié du Bocage (bār-byā dū bō-kāsh), JEAN DENIS, a distinguished geographer, born in Paris in 1760, who laid the foundation of his fame in 1788 by his Atlas to Barthélemy's *Voyage du Jeune Anacharsis*. His maps and plans to the works of Thucydides, Xenophon, etc., exhibit much erudition, and materially advanced the science of ancient geography. He also prepared many modern maps, and published various excellent dissertations. He held many honorable posts, and died in 1825.

Barbieri (bār-bē-ā'rē), GIOVANNI FRANCESCO, otherwise known as *Guercino* (the squinter) *da Cento*, an eminent and prolific historical painter, born near Bologna 1590; died in 1666. His style showed the influence of Caravaggio and of the Caracci, his best work being of the latter school. Chief work, a St. Petronilla in the Capitol at Rome; but most of the large galleries have pictures by him.—PAOLO ANTONIO BARBIERI, a celebrated still-life and animal painter, was a brother of Guercino; born 1596; died 1640.

Barbison (bār-bi-sōn'), a hamlet and favorite residence of artists, dep. Seine-et-Marne, France, on the outskirts of the forest of Fontainebleau. It owes its fame to the illustrious Barbison School (1840-75), a group of artists including Corot, Millet, Rousseau, Troyon and Daubigny, whose work showed a reaction against all false romanticism.

Barbiton (bār'bi-ton), a stringed instrument of frequent mention in Greek and Roman classical literature. It partook of some of the features of the lyre, both in its construction and in the manner in which it was played. An instrument also called barbiton was known in Europe during the 16th and 17th centuries. It was a sort of bass-lute, called *theorbo*, but identified in 18th century dictionaries with the barbiton of classic Greece and Rome.

Barbour (bār'bur), JOHN, an ancient Scottish poet, contemporary with Chaucer, born about 1316. His chief poem, *The Bruce*, written about 1375, was first published in 1571, and a MS. exists in the Advocates' Library, Edinburgh, dated 1489. Of another long poem, setting forth the Trojan origin of the Scottish kings, no MS. remains, unless a portion of two Troy books in the Cambridge and Bodleian libraries may be ascribed to Barbour. He has also been credited, probably without sufficient grounds, with having compiled a *Book of Legends of Saints*, existing in a single

MS. at Cambridge, and published only in recent times. He died in 1395. He was the father of Scottish poetry and history, and his Bruce is linguistically of high value. Though wanting in the higher qualities of poetry, it is truthful and natural, and often exhibits a high moral dignity.

Barbuda (bār-bŭ'da), one of the West Indies, annexed by Britain in 1628; about 15 miles long and 8 wide; lying north of Antigua; pop. 775. It is flat, fertile, and healthy. Corn, cotton, pepper, and tobacco are the principal produce, but the island is only partially cleared for cultivation. There is no harbor, but a well-sheltered roadstead on the w. side. It is a dependency of Antigua, and its population consists mostly of negroes chiefly engaged in cattle raising.

Barby (bār'bē), a German town on the Elbe, in the government of Magdeburg, with an old castle. Pop. 5137.

Barca (bār'ka), a division of N. Africa, between the Gulf of Sidra and Egypt, formerly under Turkish, now under Italian dominion. It formed a portion of the ancient Cyrenaica, and from the time of the Ptolemies was known as Pentapolis from its five Greek cities. The country forms mostly a rocky plateau. A large portion of it is desert, but some parts, especially near the coast, are fertile, and yield abundant crops and excellent pasture, the chief being wheat, barley, dates, figs, and olives. Flowering shrubs, roses, honeysuckles, etc., occur in great variety. There are hardly any permanent streams, but the eastern portion is tolerably well watered by rains and springs. The exports are grain and cattle, with ostrich feathers and ivory from the interior. Next to Bengazi, the capital, the seaport of Derna is the chief town. The pop. probably does not exceed 300,000.

Barcarolle (bār'ka-rōl), a species of song sung by the *barcaruoli*, or gondoliers of Venice, and hence applied to a song or melody composed in imitation.

Barcellona (bār-chel-ō'nā), a seaport of Sicily, province of Messina, immediately contiguous upon Pozzo di Gotto, and practically forming one town with it. Joint pop. 23,493.

Barcelona (bār-thel-ō'nā), one of the largest cities of Spain, chief town of the province of Barcelona, and formerly capital of the kingdom of Catalonia; finely situated on the northern portion of the Spanish Mediterranean coast. It is divided into the upper and lower town; the former modern, regular, stone-built, and often of an English architectural type, the latter old, irregular,

brick-built, and with traces of Eastern influence in the architecture. There is an inner harbor of 18 to 30 ft. depth; an outer harbor of 20 to 35 ft. The principal manufactures are cottons, silks, woollens, machinery, paper, glass, chemicals, stone-ware, soap; exports manufactured goods, wine and brandy, fruit, oil, etc.; imports coal, textile fabrics, machinery, cotton, fish, hides, silks, timber, etc. The city contains a university, several public libraries, a museum, a cathedral, and many theatres, etc. Barcelona was until the 12th century, governed by its own counts, but was afterwards united with Aragon. In 1640, with the rest of Catalonia, it placed itself under the French crown; in 1652 it submitted again to the Spanish government; in 1697 it was taken by the French, but was restored to Spain at the Peace of Ryswick. It has had several severe visitations of cholera and yellow fever, and has been the scene of many serious and sanguinary revolts as in 1836, 1840, and 1841. Population, 560,000. The province has an area of 2968 sq. mi.; pop. 1,054,541. It is generally mountainous, but well cultivated, and among the most thickly peopled in Spain.

Barcelona, a town of Venezuela, near the mouth of the Neveri, which is navigable for vessels of small size, but larger vessels anchor off the mouth of the river. Coal and salt are mined in the vicinity. Pop. about 10,000. **Barcelona Nuts**, hazel-nuts exported from the Barcelona district of Spain.

Bar'clay, ALEXANDER, a poet of the sixteenth century, most probably a native of Scotland, born about 1475, for some years a priest and chaplain of St. Mary Ottery, in Devonshire, afterwards a Benedictine monk of Ely, subsequently a Franciscan, and latterly the holder of one or two livings; died 1552. His principal work was a satire, entitled *The Shyp of Follys of this Worlde*, part translation and part imitation of Brandt's *Narrenschiff* ('Ship of Fools'), and printed by Pynson in 1509. He also wrote a *Myrrour of Good Manners*, and some *Egloges* (Eclogues), both printed by Pynson, as well as translations, etc.

Barclay, JOHN, poet and satirist, son of a Scotch father, born at Pont-a-Mousson (Lorraine), in 1582, and probably educated in the Jesuits' College there. Having settled in England he published a Latin politico-satirical romance, entitled *Euphormionis Satyricon*, having as its object the exposure of the Jesuits. In 1616 he left England for

Barclay

Rome, for some unexplained reason, and died there in 1621. His chief work is a singular romance in Latin, entitled *Argenis* (Paris, 1621), thought by some to be an allegory bearing on the political state of Europe at the period. It has been translated into several modern languages.

Barclay, ROBERT, the celebrated apologist of the Quakers, born in 1648, at Gordonstown, Moray, and educated at Paris, where he leaned to Roman Catholicism. Recalled home by his father, he followed the example of the latter and became a Quaker. His first treatise in support of his adopted principles, published at Aberdeen in the year 1670, under the title of *Truth Cleared of Calumnies*, together with his subsequent writings, did much to rectify public sentiment in regard to the Quakers. His chief work, in Latin, *An Apology for the True Christian Divinity, as the same is Preached and held forth by the People called, in scorn, Quakers*, was soon reprinted at Amsterdam, and quickly translated into German, Dutch, French, and Spanish, and, by the author himself, into English. His fame was now widely diffused; and, in his travels with William Penn and George Fox through England, Holland, and Germany, to spread the opinions of the Quakers, he was received everywhere with the highest respect. The last of his productions, *On the Possibility and Necessity of an Inward and Immediate Revelation*, was not published in England until 1686; from which time Barclay lived quietly with his family. He died, after a short illness, at his own house of Ury, Kincardineshire, in 1690. He was a friend of and had influence with James II.

Barclay de Tolly, MICHAEL, PRINCE, a distinguished general and field-marshal of Russia, born in 1761. His family, of Scottish origin, had been established in Livonia since 1689. He entered the army at an early age, served with distinction in various campaigns against the Turks, Swedes, and Poles, and in 1811 was named minister of war. On the invasion of Napoleon he was transferred to the chief command of the army, and adopted a plan of retreat; his forces did not greatly exceed 100,000 men, but the court became impatient, and after the capture of Smolensk by the French he was superseded by Kutusoff. Sinking all personal feeling, he asked leave to serve under his successor, commanded the right wing at the battle of the Moskwa, maintained his position, and covered the retreat of the rest of the army. After the battle of Bautzen, in

Bardesanes

1813, he was reappointed to the chief command, which he had soon after to resign to Prince Schwarzenberg. He forced the surrender of General Vandamme after the battle of Dresden, took part in the decisive battle of Leipzig, and was made a field-marshal in Paris. In 1815 he received from the emperor the title of prince, and from Louis XVIII the badge of the order of Military Merit. He died in 1818.

Bar-cochba (bâr-koh'bâ), SIMON, a Jewish impostor, who pretended to be the Messiah, raised a revolt, and made himself master of Jerusalem about 132 A.D., and of about fifty fortified places. Hadrian sent to Britain for Julius Severus, one of his ablest generals, who gradually regained the different forts and then took and destroyed Jerusalem. Bar-cochba retired to a mountain fortress, and perished in the assault of it by the Romans three years after, about 135.

Bar'coo. See *Cooper's Creek*.

Bard, one of an order among the ancient Celtic tribes, whose occupation was to compose and sing verses in honor of the heroic achievements of princes and brave men, generally to the accompaniment of the harp. Their verses also frequently embodied religious or ethical precepts, genealogies, laws, etc. Their existence and function was known to the Romans two centuries B.C.; but of the Gallic bards only the tradition of their popularity survives. The first Welsh bards of whom anything is extant are Taliesin, Aneurin, and Llywarch, of the sixth century. A considerable lacuna then occurs in their history until the order was reconstituted in the tenth century by King Howel Dha, and again in the eleventh by Gryffith ap Conan. Edward I is said to have hanged all the Welsh bards as promoters of sedition. Some attempts have been made in Wales for the revival of bardism, and the Cambrian Society was formed in 1818 for this purpose and for the preservation of the remains of the ancient literature. The revived Eisteddfodan, or bardic festivals, have been so far exceedingly popular. In Ireland there were three classes of bards: those who sang of war, religion, etc., those who chanted the laws, and those who gave genealogies and family histories in verse. They were famous harpists. In the Highlands of Scotland there are considerable remains of compositions supposed to be those of their old bards.

Bardesanes (bar-de'sâ-nēs), a Syrian Gnostic, who lived in the

reign of Caracalla, in Edessa, and whose system of faith bore a close resemblance to the earlier Gnostic teachings of Valentinus. He spread his doctrine by the means of hymns in the Syrian language, and they appear to have been received with favor in the orthodox Church as late as the end of the 5th century, when they were superseded by the work of Ephraem the Syrian. Of his numerous writings only a dialogue on fate survives.

Bardwan, or BURDWAN', a division of Bengal, upon the Hugli, comprising the six districts of Bardwan, Hugli, Howrah, Midnapur, Bankura, and Birbhum. Area, 13,855 sq. miles; pop. 8,245,000.—The district Bardwan has an area of 2697 sq. miles, and a pop. of 1,500,000. Apart from its products, rice, grain, hemp, cotton, indigo, etc., it has a noted coal-field of about 500 sq. miles in area, with an annual output of about three million tons.—The town of Bardwan has a fine palace of the maharajah and an extensive group of temples. Pop. about 35,000.

Barebone, or BARBON, PRAISE-GOD, the name of a leather seller in Fleet Street, London, who obtained a kind of lead in the convention which Cromwell substituted for the Long Parliament, and which was thence nicknamed the Barebone Parliament. After its dissolution he disappears till 1660, when he presented a petition to Parliament against the restoration of the monarchy. In 1661 he was committed to the Tower for some time, but his subsequent history is unknown. Died 1679.

Barefooted Friars, monks who used barefoot. They were not a distinct body, but may be found in several orders of mendicant friars—for example, among the Carmelites, Franciscans, Augustines. There were also barefooted nuns.

Barège (ba-rāzh'), a light, open tissue of silk and worsted or cotton and worsted for women's dresses, originally manufactured near Barèges.

Barèges (bā-rāsh'), a watering-place, s. of France, dep. Hautes-Pyrénées, about 4000 feet above the sea, celebrated for its thermal springs, which are frequented for rheumatism, scrofula, etc. The place is hardly inhabited except in the bathing season, June till September.

Baregine (ba-rāzh'in; from *Barèges*), a gelatinous product of certain algae growing in sulphuric mineral springs, and imparting to them the color and odor of flesh-broth.

Bareilly (ba-rā'li), a town of Hindustan in the N. W. Prov-

inces, capital of a district of same name, on a pleasant and elevated site. It has a fort and cantonments, a government college, and manufactures sword-cutlery, gold and silver lace, perfumery, furniture and upholstery. On the outbreak of the Indian mutiny the native garrison took possession of the place, but it was retaken by Lord Clyde in May, 1858. Pop. 131,208. The district has an area of 1595 sq. miles; pop. 1,040,000.

Barents (bār'ents), WILLEM, a Dutch navigator of the end of the 16th century, who, on an expedition intended to reach China by the northeast passage, discovered Nova Zembla. He wintered there in 1596-97, and died before reaching home.

Barretti (bā-ret'tē), GIUSEPPE, an Italian writer, born at Turin, 1719. In 1748 he came to England, and in 1753 published in English a *Defence of the Poetry of Italy against the Censures of M. Voltaire*. In 1760 he brought out a useful *Italian and English Dictionary*. After an absence of six years, during part of which he edited the *Frusta Letteraria* ('Literary Scourge') at Venice, he returned to England, and in 1768 published an *Account of the Manners and Customs of Italy*. Not long after, in defending himself in a street brawl, he stabbed his assailant and was tried for murder at the Old Bailey, but acquitted; Johnson, Burke, Goldsmith, Garrick, Reynolds, and Beauclerk giving testimony to his good character. An *English and Spanish Dictionary* and various other works, followed before his death in 1789.

Barfleur (bār-fleur), at one time the best port on the coast of Normandy, and the reputed port from which William the Conqueror sailed to England. In 1120 the 'White Ship' sank outside the harbor, with Prince William, only son of Henry I, on board. Present pop. about 1000.

Barfrush, BARFURUSH'. Same as *Balfroosh*.

Bargain and Sale, a legal term denoting the contract by which lands, tenements, etc., are transferred from one person to another.

Barge (bārj), a term similar in origin to *barque*, but generally used of a flat-bottomed boat of some kind, whether used for loading and unloading vessels, or as a canal-boat, or as an ornamental boat of state or pleasure.

Barge-board (perhaps a corruption of *verge-board*), in architecture, a board generally pendent from the eaves of gables, so as to conceal the rafters, keep out rain, etc. They are

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Barham

sometimes elaborately ornamented. The portion of the roof projecting from the



Barge-board of the Fifteenth Century

wall at the gable-end, and beneath which the barge-board runs, is termed the *barge-board*.

Barham (bar'am), RICHARD HARE'S, a humorous writer, born in 1788 at Canterbury; educated at Paul's School, London, and at Brasenose, Oxford. He was ordained in 1813, and after a succession of various ecclesiastical appointments, he became in 1821 one of the minor canons of St. Paul's Cathedral. He published an unsuccessful novel, *Baldwin*, wrote nearly a third of the articles in *Gorton's Biographical Dictionary*, and contributed to *Blackwood's Magazine*. In 1824 he was appointed priest in ordinary of the chapel-royal. Undeterred by the failure of his first novel, he published a second in 1834. In 1837, on the starting of *Bentley's Miscellany*, he laid the main foundation of his literary fame by the publication in that periodical of the *Ingoldsby Legends*. He died in 1845.

Bar Harbor, a village and popular summer resort of Mt. Desert Island, Maine, 46 miles S.E. of Bangor. It has annually 15,000 to 20,000 summer visitors, and ranks with Newport as an exclusive fashionable resort.

Barhebræus. See *Abulfaragius*.

Bari (bā'rē; anc. *Barium*), a seaport of S. Italy, on a small promontory of the Adriatic, capital of the province of the same name. It was a place of some importance as early as the 3d century B.C., and has been thrice destroyed and rebuilt. The present town, though poorly built for the most part, has a fine cathedral begun in 1035, medieval churches, etc. It manufactures cotton and linen goods, hats, soap, glass, and liquors; has a trade in wine, grain, almonds, oil, etc., and is now an important seaport.

Pop. about 108,670. The modern province of Bari has an area of 2066 sq. miles, and is fertile in fruit, wine, oil, etc.; pop. 837,683.

Bari, a negro people of Africa, dwelling on both sides of the White Nile, and having Gondokoro as their chief town. They practise agriculture and cattle-rearing. Their country was conquered by Sir Samuel W. Baker for Egypt.

Barilla (ba-rilla), the commercial name for the impure carbonate and sulphate of soda imported from Spain and the Levant. It is the Spanish name of a plant (*Salsola sativa*), from the ashes of which and from those of others of the same genus the crude alkali is obtained. On the shores of the Mediterranean the seeds of the plants from which it is obtained are regularly sown near the sea, and these, when at a sufficient state of maturity, are pulled up, dried, and burned in bundles in ovens or in trenches. It is now used principally in the manufacture of soap and glass. Soda is now obtained for the most part from common salt.

Baring-Gould (bā-ring-gōld'), SA-BINE, English clergyman and author, born at Exeter 1834. He was educated at Cambridge, held several livings in the English Church, wrote with considerable success on theological and miscellaneous subjects, and more recently distinguished himself as a novelist. Among his works are: *Iceland, Its Scenes and Scags*; *Curious Myths of the Middle Ages*; *The Origin and Development of Religious Belief*; *Lives of the Saints* (10 vols.); besides the novels *Mekalah*, *John Herring*, *Richard Cable*, *The Gaverocks*, etc.; and short stories or novelettes; and a number of hymns, among them *Onward*, *Christian Soldiers*.

Baringo, a lake in Africa, N.E. of the Victoria Nyanza, about 20 miles long.

Barisal (bur-ē-sāl'), a town of British India, in Backergunje district, Eastern Bengal and Assam, on a river of the same name. It is an important trade center. Pop. 18,978.

Barite (ba'rit), a mineral with the formula BaSO₄, occurring massive, and in granular, earthy and stalactite forms. Sp. gravity ranges from 4.3 to 4.6, hence sometimes called 'heavy-spar.' It occurs in large quantities in many parts of the world. It forms an important source of barium compounds.

Baritone, or BARTONE (bār'i-tōn), a voice, male voice, the compass of which partakes of those of the common bass and the tenor, but does not extend so far downwards as the one nor to an

equal height with the other. Its best tones are from the lower A of the bass clef to the lower F in the treble. Formerly applied to lower, or heavy, bass voice: bary, i. e. heavy, tone.

Barium (bā'ri-um), a metallic element of yellow color, symbol Ba, specific gravity 4. It is found only in compounds, such as the common sulphate and carbonate, and was isolated by Davy for the first time in 1808. It is malleable and fuses at a low temperature. It decomposes water at low temperatures, and when exposed to the air quickly combines with oxygen, which it is used to isolate; also used to precipitate sulphates from solutions.

Bark, the exterior covering of the stems of exogenous plants. It is composed of cellular and vascular tissue, is separable from the wood, and is often regarded as consisting of four layers: 1st, the *epidermis* or *cuticle*, which, however, is scarcely regarded as a part of the true bark; 2d, the *epiphloeum* or outer cellular layer of the true bark or cortex; 3d, the *mesophloeum* or middle layer, also cellular; 4th, an inner vascular layer, the *liber* or *endophloeum*, commonly called *bast*. Endogenous plants have no true bark. Bark contains many valuable products, as gum, tannin, etc.; cork is a highly useful substance obtained from the *epiphloeum*; and the strength and flexibility of *bast* makes it of considerable value. Bark used for tanning is obtained from oak, hemlock-spruce, a species of acacia growing in Australia, etc. Angostura bark, Peruvian or cinchona bark, cinnamon, cascarilla, etc., are useful barks.

Bark. See *Barque*.

Bark, PERUVIAN, is a bark of various species of trees of the genus *Cinchona*, found in many parts of South America, but more particularly in Peru, and having medicinal properties. It was formerly called *Jesuit's bark*, from its having been introduced into Europe by Jesuits. Its medicinal properties depend upon the presence of the alkaloid *quinine*, which is now extracted from the bark, imported, and prescribed in place of nauseous mouthfuls of bark. See *Cinchona*.

Barker's Mill, also called Scottish turbine, a hydraulic machine on the principle of what is known as the hydraulic tourniquet. This consists of an upright vessel free to rotate about a vertical axis, and having at its lower end two discharging pipes projecting horizontally on either side and bent in opposite directions at the ends,

through which the water is discharged horizontally, the direction of discharge being mainly at right angles to a line joining the discharging orifice to the axis. The backward pressures at the bends of the tubes, arising from the two issuing jets of water, cause the apparatus to revolve in an opposite direction to the issuing fluid.

Barking, a town of England, county of Essex, on the Roding, 7 miles N. E. of London, with some important manufacturing works. Near it is the outfall of the sewage of a large part of London. Pop. (1911) 81,302.

Bark-stove, BARK-BED, a sort of hot-house for forcing or for growing plants that require a great heat combined with moisture, both of which are supplied by the fermentation that sets up in a bed of spent tanner's bark contained in a brick pit under glass.

Bar'laam and Jos'aphat, a *fa. moui* mediæval spiritual romance, which is in its main details a Christianized version of the Hindu legends of Buddha. The story first appeared in Greek in the works of Joannes Damascenus in the eighth century. The compilers of the *Gesta Romanorum*, Boccaccio, Gower, and Shakespere have all drawn materials from it.

Bar-le-duc (bâr-l-dûk), a town of Northeast France, on the river Ornain, capital of the department of Meuse, with manufactures of cotton and woolen stuffs, leather, confectionery, etc. Pop. (1906) 14,624.

Barletta (bar-let'tà), a seaport in South Italy, province of Bari, on the Adriatic, with a fine Gothic church; it has a considerable export trade in grain, wine, almonds, etc. Pop. 40,388.

Barley (bâr'li), the name of several cereal plants of the genus *Hordeum*, order Gramineæ (grasses), yielding a grain used as food and also for making malt, from which are prepared beer, porter, and whisky. Barley has been known and cultivated from remote antiquity, and beer was made from it among the Egyptians. The cultivation of it extends from Italy northward in Europe, it being used for making bread in the north, being better adapted than any other grain to the most northerly grain-growing latitude. The species principally cultivated are *Hordeum distichum*, two-rowed barley; *H. vulgare*, four-rowed barley; and *H. hexastichum*, six-rowed, of which the small variety is the sacred barley of the ancients. The varieties of the four and six-rowed

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species are generally coarser than those of the two-rowed, and adapted for a poorer soil and more exposed situation. Some of these are called *bers* or *biggs*. In Britain barley occupies about the same area as wheat, but in N. America the extent of it as a crop is comparatively small, being in Canada, however, relatively greater than in the States, and the Canadian barley is of very high quality. Barley is better adapted for cold climates than any other grain, and some of the coarser varieties are cultivated where no other cereal can be grown. *Pot* or *Scotch barley* is the grain deprived of the husk in a mill. *Pearl barley* is the grain polished and rounded and deprived of husk and pellicle. *Patent barley* is the farina obtained by grinding pearl barley. *Barley water*, a decoction of pearl barley, is used in medicine as possessing emollient, diluent, and expectorant qualities.

Barley-sugar, pure sugar melted and allowed to solidify into an amorphous mass without crystallizing.

Barlow (bär'lō), JOEL, an American poet and diplomatist; born in Connecticut in 1754. After an active and changeful life as chaplain in the Revolutionary war, lawyer, editor, land-agent, lecturer, and consul, he went to Paris and acquired a fortune. On his return to America he was appointed minister plenipotentiary to France (1811), but died near Cracow in 1812 on his way to meet Napoleon. His principal poem, the *Columbiad*, dealing with American history from the time of Columbus, was published in 1807. It is a weighty epic which no one now reads.

Barm. See *Yeast*.

Barmecides (bär'me-sīdz), a distinguished Persian family, whose virtue and splendor form a favorite subject with Mohammedan poets and historians. Two eminent members of this family were Khaled-ben-Barmek, tutor of Harun al Rashid; and his son Yahya, grand vizier of Harun. The expression *Barmecides Feast*, meaning a visionary banquet or make-believe entertainment, originates from the Barber's story of his Sixth Brother in the *Arabian Nights' Entertainments*.

Barmen (bär'men), a German city on the Wupper, in the Prussian Rhine Province, government of Düsseldorf, and forming a continuation of the town of Elberfeld, in the valley of Barmen. It has extensive ribbon and other textile manufactures. A monorail system of transit is in successful operation be-

tween Elberfeld and Barmen. Pop. (1905), 109,214.

Barnabas (bär'na-bas), the surname given by the apostles to Joses, a fellow-laborer of Paul, and, like him, ranked as an apostle. According to tradition he became the first bishop of Milan, but he is not mentioned in Ambrose's list; it is thought that he suffered martyrdom at Cyprus. His festival is held on the 11th June.

Barnabas, SAINT, EPISTLE OF, an epistle in twenty-one chapters unanimously ascribed to Barnabas by early Christian writers, but without any support of internal evidence. It was probably written between 119 and 126 A.C., by one who was not a Jew and under the influence of Alexandrian Judaistic thought.

Barnabites (bär'na-bīts), an order of canons founded in Milan in 1530 and named after the Milan church of St. Barnabas, which was allotted them to preach in. A few houses of the congregation still exist in Belgium and Italy.

Barnacle (bär'na-kl), the name of a family (*Lepadidæ*) of marine crustaceous animals, order *Cirripedia*. They are enveloped by a mantle and shell, composed of five principal valves and several smaller pieces, joined together by a membrane attached to their circumference; and they are furnished with a long, flexible, fleshy stalk or peduncle, provided with muscles, by which they attach themselves to ships' bottoms, submerged timber, etc. They feed on small marine animals brought within their reach by the water and secured by their tentacula. Some of the larger species are edible. According to an old fable, these animals produced barnacle geese.



Barnacle
(*Lepas anatifera*).

Barnacle Goose (*Anser bernicla* or *leucopsis*), a summer visitant of the northern seas, in size rather smaller than the common wild goose, and having the forehead and cheeks white, the upper body and neck black. This bird became the subject of a curious popular fable, not yet extinct, being believed to be bred from the fruit of a tree growing on the seashore, or from a shellfish which grew on the tree, or from rotting wood in the water.

Barnard-Castle, a town of England, County Durham. There are a large threadmill and carpet

manufactories. It has the ruins of a stately castle originally built in 1178 by Bernard Balliol, grandfather of John Balliol, and a valuable fine-art museum. Pop. 4757.

Barnard College, a non-sectarian institution for the education of women in New York City. It is included in the educational system of Columbia University (q. v.). All Barnard degrees are granted by and in the name of Columbia University, whose president is ex-officio president of Barnard. The endowment of the college is about \$1,500,000, and the value of the buildings and grounds nearly \$4,000,000. Miss Virginia Crocheron Gildersleeve was appointed dean in 1911. The enrolment of students in 1916 was 760.

Barnard, EDWARD EMERSON, astronomer, born at Nashville, Tennessee, in 1857; graduated at Vanderbilt University 1887; was astronomer at the Lick Observatory 1887-95; afterwards at the Yerkes observatory and professor of Astronomy at the University of Chicago. He discovered in 1892 a fifth satellite of Jupiter, made other discoveries of importance, and did valuable work in celestial photography. He has been awarded the gold medals of various French and British societies.

Barnard, FREDERICK AUGUSTUS, teacher and educational writer, born at Sheffield, Mass., in 1809. He graduated at Yale in 1828, was professor in the University of Alabama 1837-54, took orders in the P. E. Church in 1854, was president of the University of Mississippi 1856-61, and 1864-88 president of Columbia College, New York, which he endowed with Barnard College. He wrote *Recent Progress of Science*, *The Metric System*, *Letters on College Government*, etc. He died April 27, 1889.

Barnard, GEORGE GREY, sculptor, born at Bellefonte, Pennsylvania, May 24, 1863, educated at Art Institute, Chicago, and at Ecole Nationale des Beaux Arts, Paris; was awarded gold medals at the Paris Exposition of 1900 and the Buffalo Exposition of 1901. His productions include *Brotherly Love*, *Two Natures*, *The God Pan* (in Central Park, N. Y.), *Mother and Angel*, *Urn of Life*, *The Life of Humanity* (made for the Pennsylvania State Capitol), and the world-famous *Lincoln*, unveiled in Lytte Park, Cincinnati, in 1917. A replica of the latter was selected by the American Committee for the Celebration of the Century of Peace between Great Britain and America as its gift to England. The statue emphasizes the homely characteristics of Lincoln and aroused much controversy.

Barnardo, THOMAS JOHN, a philanthropist, born in Ireland in 1845, died 1906. In 1866, while studying in London Hospital, he became interested in the condition of homeless children, founded a 'Home' for them in 1867, and afterwards organized institutions in which 60,000 orphan waifs were rescued and trained for useful careers. He founded the Young Helpers' League in 1891 and wrote much on the reclamation of deserted children.

Barnaul (bár-na-ül'), a town in Siberia, and capital of the important Altai mining district; has gold, copper and silver mines in its vicinity and many furnaces and smelters. Pop. 26,850.

Barnave (bár-näv), ANTOINE PIERRE JOSEPH MARIE, a distinguished French revolutionist, who successfully maintained against Mirabeau the right of the National Assembly against that of the king to declare for peace or war, but afterwards asserted the inviolability of the king's person; was arrested, condemned, and guillotined. Born 1761; died 1793.

Barnes (bärns), ALBERT, theologian, born in the State of New York in 1798. In 1825 he was ordained pastor of the Presbyterian Church of Morristown, New Jersey, and from 1830 till his death in 1870 had charge of the First Presbyterian Church in Philadelphia. He is chiefly known by his *Notes on the New Testament* and *Notes on the Old Testament*. He was tried for heresy because of his belief in universal atonement, and although acquitted the trial caused a split in the Presbyterian Church, a New School being established (1837).

Barnes, WILLIAM, an English dialect poet and philologist, born in Dorsetshire in 1800; died in 1886. Of humble birth, he first entered a solicitor's office, then taught a school in Dorchester, and having taken orders became rector of Winterbourne Came in his native county and died there. He acquired a knowledge of many languages, and published works on Anglo-Saxon and English, *Poems of Rural Life* in the Dorset dialect, and *Rural Poems* in common English.

Barneveldt (bär-ne-velt), JOHN VAN OLDEN, grand pensionary of Holland during the struggle with Philip II of Spain; born in 1549. After the assassination of William of Orange, and the conquest of the south provinces by the Spaniards under Parma, he headed the embassy to secure English aid. Finding, however, that the Earl of Leicester proved a worse than useless ally, he secured the elevation of the young Maurice of Nassau to the post of stad-

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holder, at the same time by his own wise administration doing much to restore the prosperity of the state. After serving as ambassador to France and England, he succeeded in 1607 in obtaining from Spain a recognition of the independence of the States, and two years later in concluding with her the twelve years' truce. Maurice, ambitious of absolute rule and jealous of the influence of Barneveldt, was interested in the continuance of the war, and lost no opportunity of hostile action against the great statesman. In this he was aided by the strongly-marked theological division in the state between the Gomarites (the Calvinistic and popular party) and the Arminians, of whom Barneveldt was a supporter. Maurice, who had thrown in his lot with the Gomarites, encouraged the idea that the Arminians were the friends of Spain, and procured the assembly of a synod at Dort (1618) which violently condemned them. Barneveldt and his friends Grotius and Hoogerbeets were arrested, and subjected to a mock trial; and Barneveldt, to whom the country owed its political existence and the commons their retention of legislative power, was beheaded on May 13th, 1619. His sons four years later attempted to avenge his death; one was beheaded, the other escaped to Spain.

Barnaley (barnz'le), a town of England, W. Riding of Yorkshire. Its staple industries are the manufacture of linens, glass, iron, steel, and needles, and there are numerous collieries in the neighborhood. Pop. (1911) 50,623.

Barnstable (barn'sta-b'l), a seaport of Massachusetts, on a bay of the same name, a part of Cape Cod Bay. It is the county town of Barnstable Co., a sandy region, largely devoted to cranberry cultivation. The town has numerous vessels engaged in fisheries and the coast trade. Pop. 4600.

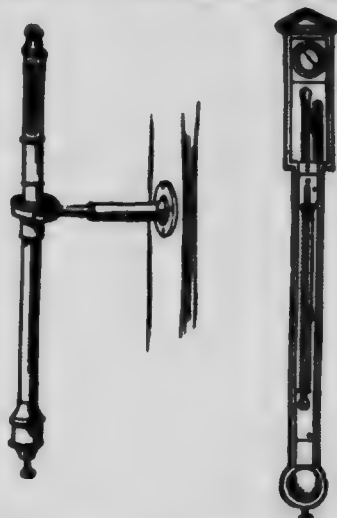
Barnstaple (barn'sta-p'l), a seaport of England, county of Devon, on the right bank of the Taw, crossed by a 12th century bridge; manufactures of lace, paper, pottery, furniture, toys and turnery, and leather. Pop. (1911) 14,488.

Bar'num, PHINEAS T., a famous American showman, born at Bethel, Connecticut, in 1810; died in 1891. In 1841 he established a museum in New York City, devoted to real and pretended wonders and which won great celebrity. The most notable of his achievements was the bringing to America of the famous Swedish vocalist, Jenny Lind, who through her own powers and

his skillful advertising was a success. See his *Life*, written by himself. **Baroach**. See *Brouch*.

Baroda (ba-ro'da), a non-tributary state, but subordinate to the Indian government; situated in the north of the Bombay presidency. It consists of a number of detached territories in the province of Guzerat, and is generally level, fertile, and well cultivated, producing luxuriant crops of grain, cotton, tobacco, opium, sugar-cane, and oil-seeds. There is a famous breed of large white oxen used as draught cattle. Area 8226 sq. miles; pop. (est.) 1,953,000. The ruler is called the *Gaekwar*. The dissensions of the Baroda family have more than once called for British intervention, and in 1875 the ruling Gaekwar was tried and deposed in connection with the charge of attempt to poison the British resident.—**BARODA**, the capital, is the third city in the Bombay presidency. It consists of the city proper within the walls and the suburbs without, and is largely composed of poor and crowded houses, but has also some fine buildings, and is noted for its Hindu temples kept up by the state. Pop. 103,800 (including troops in the adjoining cantonment).

Barometer (ba-rom'e-ter), an instrument for measuring the weight or pressure of the atmosphere and thus determining changes in



Marine Barometer.

Common Upright Barometer.

the weather, the height of mountains, and other phenomena. It had its origin about the middle of the seventeenth century in an experiment of Torricelli, an Italian, who found that if a glass tube

about 3 feet in length, open at one end only, and filled with mercury, was placed vertically with the open end in a cup of the same fluid metal, a portion of the mercury descended into the cup, leaving a column only about 30 inches in height in the tube. He inferred, therefore, that the atmospheric pressure on the surface of the mercury in the cup forced it up the tube to the height of 30 inches, and that this was so because the weight of a column of air from the cup to the top of the atmosphere was equal only to that of a column of mercury of the same base and 30 inches high. Pascal confirmed the conclusion in 1645; six years afterwards it was found by Perier that the height of the mercury in the Torricellian tube varied with the weather; and, in 1665, Boyle proposed to use the instrument to measure the height of mountains. The height of the barometer is expressed in English inches in England and America, but the metric system is used in all scientific work excepting meteorology. In France and most European countries the metric system is used.

The common or *cistern* barometer, which is a modification of the Torricellian tube, consists of a glass tube 33 inches in length and about one-third of an inch in diameter, hermetically sealed at the top, and having the lower end resting in a small vessel containing mercury, or bent upwards and terminating in a glass bulb partly occupied by the mercury and open to the atmosphere. The tube is first filled with purified mercury, and then inverted, and there is affixed to it a scale to mark the height of the mercurial column, which comparatively seldom rises above 31 or sinks below 28 inches. In general the rising of the mercury presages fair weather, and its falling the contrary, a great and sudden fall being the usual presage of a storm. Certain attendant signs, however, have also to be noted: thus, when fair or foul weather follows almost immediately upon the rise or fall of the mercury, the change is usually of short duration; while if the change of weather be delayed for some days after the variation in the mercury, it is usually of long continuance. The direction of the wind has also to be taken into account.

The *siphon* barometer consists of a bent tube, generally of uniform bore, having two unequal legs, the longer closed, the shorter open. A sufficient quantity of mercury having been introduced to fill the longer leg, the instrument is set upright, and the mercury takes such a position that the difference of the levels in the

two legs represents the pressure of the atmosphere. In the best siphon barometers there are two scales, one for each leg, the divisions on one being reckoned



Siphon Barometer. Wheel Barometer.

upwards, and on the other downwards from an intermediate zero point, so that the sum of the two readings is the difference of levels of the mercury in the two branches.

The *wheel* barometer is the one that is most commonly used for domestic purposes. It is far from being accurate, but it is often preferred for ordinary use on account of the greater range of its scale, by which small differences in the height of the column of mercury are more easily observed. It usually consists of a siphon barometer, having a float resting on the surface of the mercury in the open branch, a thread attached to the float passing over a pulley, and having a weight as a counterpoise to the float at its extremity. As the mercury rises and falls the thread and weight turn the pulley, which again moves the index of the dial.

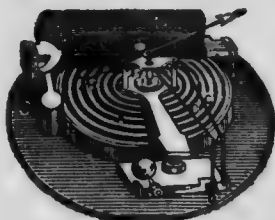
The *mountain* barometer is a portable mercurial barometer with a tripod support and a long scale for measuring the altitude of mountains. To prevent breakage, through the oscillations of such a heavy liquid as mercury, it is usually carried inverted, or it is furnished with a movable basin and a screw, by means of which the mercury may be forced up to the top of the tube. For delicate operations, such as the measurement of altitudes, the scale of the barometer is furnished with a nonius or vernier, which greatly increases the minuteness and accuracy of the scale. For the rough estimate of altitudes the following rule

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is sufficient:—As the sum of the heights of the mercury at the bottom and top of the mountain is to their difference, so is 52,000 to the height to be measured, in feet. (See also *Heights, Measurement of*.) In exact barometric observations two corrections require to be made, one for the depression of the mercury in the tube by capillary attraction, the other for temperature, which increases or diminishes the bulk of the mercury. In regard to the measurement of heights the general rule is to subtract the ten-thousandth part of the observed altitude for every degree of Fahrenheit above 32°.

In the *aneroid* barometer, as its name implies (Gr. *a*, not, *nēros*, liquid), no fluid is employed, the action being dependent upon the susceptibility to atmospheric pressure shown by a flat circular metallic chamber from which the air



Aneroid Barometer.

has been partially exhausted, and which has a flexible top and bottom of corrugated metal plate. By an ingenious arrangement of springs and levers the depression or elevation of the surface of the box is registered by an index on the dial, by which means it is also greatly magnified, being given in inches to correspond with the mercurial barometer. Aneroids are, however, generally less reliable than mercurial barometers, with which they should be frequently compared. The cut shows an aneroid without its case. A is the partially exhausted chamber, B a strong spring connected with its top and with the base-plate, C a lever from B connected through the bent lever D with the chain E coiled round F, and always kept tense by the spiral spring G. As the top of A rises or falls its motion is transmitted by B to the levers and chain so as to move the needle H. At J is seen the tube through which the air is drawn from A.

Barometz (bar'ō-metz), a prostrate fern, which grows in the salt-plains near the Caspian Sea. It is covered with a yellow silky down, from which of old costly garments are said to have been woven. It is also known as the Tatar or Scythian Lamb, it bearing a rough resemblance to an animal and a hairy covering. The Russians formerly regarded it as at once plant and animal, believing it, while growing on a stalk, to

have the organs and limbs of a lamb, to eat grass, and have other animal characteristics.

Baron (bār'un), originally, in the feudal system, the vassal or immediate tenant of any superior; but the term was afterwards restricted to the king's barons, and again to the greater of these only, who attended the Great Council, or who, at a later date, were summoned by writ to Parliament. It was the second rank of nobility, until dukes and marquises were introduced and placed above the earls, and viscounts were also set above the barons, who, therefore, now hold the lowest rank in the British peerage. The present barons are of three classes: (1) barons by prescription, whose ancestors have immemorially sat in the Upper House; (2) by patent; (3) by tenure, i.e. holding the title as annexed to land. The coronet is a plain gold circle with six balls or large pearls on its edge, the connected cap being of crimson velvet.—*Baron and feme*, a term used for husband and wife in the English law.—*Baron of beef*, two sirloins not cut asunder.

Baronet (bār'un-et), a hereditary dignity in Great Britain and Ireland, next in rank to the peerage, originally instituted by James I, in 1611, nominally to promote the colonization and defense of Ulster, each baronet, on his creation being originally obliged to pay into the treasury a sum of £1095, exclusive of fees. Baronets in Ireland were instituted in 1620, and in Scotland in 1625, the latter being called Baronets of Scotland and Nova Scotia, because their creation was originally intended to further the colonization of Nova Scotia. But the baronets of Scotland and of Ireland have been baronets of the United Kingdom if created since 1707 and 1801, respectively. A baronet has the title of 'Sir' prefixed to his Christian and surname, and his wife is 'Lady' so-and-so. Baronets rank before all knights. They have as their badge a 'bloody hand' (the arms of Ulster), that is, a left hand, erect and open, cut off at the wrist, and red in color.

Baronius (ba-rō'ni-us), or BARONIO, CESAR, an Italian ecclesiastical historian, born 1538; educated at Naples; in 1557 went to Rome; was one of the first pupils of St. Philip of Neri, and member of the oratory founded by him; afterwards cardinal and librarian of the Vatican Library. He owed these dignities to the services which he rendered the church by his *Ecclesiastical Annals*, comprising valuable documents from the papal archives, on which he labored from

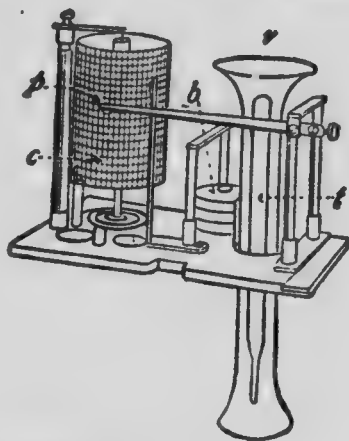
Barons' War

the year 1580 until his death, June 30, 1607. They were continued, though with less power, by other writers, of whom Raynaldi takes the first rank.

Barons' War, the war carried on for several years by Simon de Montfort and other barons of Henry III against the king, beginning in 1263.

Barony (bár'un-i), a manor or landed estate under a baron, who formerly had certain rights of jurisdiction in his barony and could hold special courts. In Ireland baronies are still the chief subdivisions of the counties.

Barothermograph (bar-ò-thér'm ò-gráf), an apparatus for recording simultaneously the atmospheric pressure and temperature;



Assmann's Barothermograph.
b, aneroid barometer which gives horizontal motion to the cylinder, c; t, thermometer inside a protecting tube, r, which gives vertical motion to the pen, p.

a combination of barograph and thermograph, especially such as are made portable and very light to be sent up with kites and sounding-balloons.

Barouche (ba-ròsh'), a four-wheeled carriage with a falling top and two inside seats in which four persons can sit, two fronting two.

Barque (bàrk), a three-masted vessel of which the foremast and mainmast are square-rigged, but the mizzenmast has fore-and-aft sails only.

Barquesimeto (bàr-kä-sē-má'tò), a city in the north of Venezuela, capital of the state of Lara. Population about 15,000.

Barr, AMELIA EDITH, a novelist, born in Ulverston, England, in 1831. Marrying Robert Barr, she went to Texas

in 1854, and was left a widow in 1867. She then removed to New York, engaged in writing for periodicals, and after 1880 produced many novels, some of them very popular. Among the best known are *Jan Vedder's Wife*, *A Bow of Orange Ribbon*, *The Lone House*, and *Friend Olivia*. Died March 10, 1919.

Barr, ROBERT, a Scottish novelist, born in Glasgow in 1850. He lived for a time in America, engaged on the *Detroit Free Press*. In 1881 he went to England, where he wrote under the name of 'Luke Sharp.' Among his numerous tales are *In a Steamer Chair*, *The Face and the Mask*, *In the Midst of Alarms*, *The Mutable Many*, *Tekla*, etc. With Jerome K. Jerome he founded the *Idler* magazine in 1892. He died in 1912.

Barra (bàr'ra), a town of Italy, about 3 miles east of Naples. Pop. 11,975.

Barra, or BAR, a small kingdom in Africa, near the mouth of the Gambia. The Mandingoes, who form a considerable part of the inhabitants, are Mohammedans and the most civilized people on the Gambia. Pop. 200,000. It is part of the British colony of Gambia.

Barra, an island of the Outer Hebrides, w. coast of Scotland, belonging to Inverness-shire; 8 miles long and from 2 to 5 broad, of irregular outline, with rocky coasts, surface hilly but furnishing excellent pasture. On the w. coast the Atlantic, beating with all its force, has hollowed out vast caves and fissures. Large herds of cattle and flocks of sheep are reared on the island. The coast waters of this and adjacent islands abound with fish, and fishing is an important industry. Pop. about 2500.

Barracan (bàr'a-kan), strictly, a thick strong stuff made in Persia and Armenia of camel's hair, but the name has been applied to various wool, flax, and cotton fabrics.

Barrack (bàr'ak Spanish *baraca*), originally a small cabin or hut for troops, but now applied to the permanent buildings in which troops are lodged.

Barrackpur (bàr-ak-pòr'), a town and military cantonment, Hindustan, on the left bank of the Hooghly, 15 miles N. N. E. of Calcutta. The suburban residence of the viceroy is in Barrackpur Park. Pop. 17,700.

Barracoön (bàr'a-köön), a negro barrack or slave depot, formerly plentiful on the west coast of Africa, in Cuba, Brazil, etc.

Barrafran'ca, a town of Sicily, prov. Caltanissetta. Pop. 10,873.

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Barrage (bár-razh), or curtain-fire. See *Artillery*.

Barramunda. See *Ceratodus*.

Barranquilla (bár-rán-kél'yá), a port of South America, in Colombia, on a branch of the river Magdalena, near its entrance into the Caribbean Sea, connected by rail with the seaport Sabanilla. Pop. about 48,000.

Barras (bá-rá), PAUL FRANÇOIS JEAN NICHOLAS, COMTE DE, member of the French national convention and of the executive directory, born in Provence 1755; died in 1829. After serving in the army in India and Africa, he joined the revolutionary party and was a deputy in the tiers-état. He took part in the attack upon the Bastille and upon the Tuileries, and voted for the death of Louis XVI. In the subsequent events he displeased Robespierre, and on this account joined the members of the committee, who foresaw danger awaiting them, and being entrusted with the chief command of the forces of his party he succeeded in the overthrow of Robespierre. On Feb. 4, 1795, he was elected president of the convention, and on Oct. 5, when the troops of the sections which favored the royal cause approached, Barras for a second time received the chief command of the forces of the convention. On this occasion he employed General Bonaparte, for whom he procured the chief command of the army of the interior, and afterwards the command of the army in Italy. From the events of the 18th Fructidor (Sept. 4, 1797) he governed absolutely until the 13th June, 1799, when Siéyès entered the directory, and in alliance with Bonaparte procured his downfall in the revolution of the 18th Brumaire (Nov. 9, 1799). He afterwards resided at Brussels, Marseilles, Rome, and Montpellier under surveillance, returning to Paris only after the restoration of the Bourbons.

Barratry (bár'a-tri), in commerce, any fraud committed by the master or mariners of a ship, whereby the owners, freighters, or insurers are injured, as by evading foreign port duties; deviation from the usual course of the voyage, by the captain, for his own private purposes; trading with an enemy, whereby the ship is exposed to seizure; willful violation of a blockade; willful resistance of search by a belligerent vessel, where the right of search is legally exercised; fraudulent negligence; embezzlement of any part of the cargo, etc.

Barratry, Common, in law, the stirring up of lawsuits and quarrels between other persons, the party

guilty of this offense being indictable as a common barrator or barretor. The commencing of suits in the name of a fictitious plaintiff is common barratry.

Barre (bár-ré), a city of Washington Co., Vermont, the seat of Goddard Seminary. It is the granite center of the United States, has extensive quarries, also manufactures of foundry products, stone-cutters' tools, etc. Pop. 11,500.

Barrel (bar'el), a well-known variety of wooden vessel; also used as a definite measure and weight. A barrel of beer is 36 gals., of flour 196 lbs., of beef or pork 200 lbs.

Barrel-organ, a musical instrument usually carried by street musicians, in which a barrel studded with pegs or staples, when turned round, opens a series of valves to admit air to a set of pipes, or acts upon wire strings like those of the piano, thus producing a fixed series of tunes.

Barrett (bar'et), LAWRENCE (BRANNIGAN), a leading actor, son of an Irish mechanic, born in Paterson, New Jersey, in 1838. He showed as an amateur his special talent while working in a store, went on the professional stage in 1854, and soon reached front rank in his profession. Was closely associated with Edwin Booth, whose *Life* he wrote. Died in 1891.

Barrett, WILSON, an English actor, novelist, dramatist and poet, born in 1846; died in 1904; is best remembered for his great spectacular play, *The Sign of the Cross*.

Barricade (bár'i-kád), an obstruction hastily raised to defend a narrow passage, such as a street, defile, or bridge. When beams, chains, chevaux-de-frise and prepared materials are wanting, wagons, barrows, casks, chests, branches of trees, paving-stones, etc., are available for the purpose. They have been frequently used in popular outbursts, especially in Paris, though their accessibility to attack by breaking through the houses of adjoining streets makes a prolonged tenure impossible.

Bar'rie, a town of Ontario, Canada, on the Grand Trunk R. R. 64 miles N. N. W. of Toronto, on an arm of Lake Simcoe. It has planing mills, a tannery, carriage works, gas engine works, flour mills, etc. Pop. (1911) 6468.

Barrie, SIR JAMES MATTHEW, a Scotch author, born at Kirriemuir, in 1860. Became a journalist in London in 1885. He showed marked humor and pathos in *A Window in Thrums* and *The Little Minister*, the latter being dramatized in 1897. Other works are *Sentimental Tommy*, *Margaret Ogilvy*,

Tommy and Grisel, Peter Pan in Kensington Gardens, Peter and Wendy, etc. His dramatic works include, *The Professor's Love Story, The Wedding Guest, Quality Street, The Admirable Crichton, Little Mary, Peter Pan, Alice Sit-by-the-Fire, What Every Woman Knows, etc.*

Barrier Treaty, the name given to three treaties, 1709 and 1713 and 1715, between Great Britain and Holland, by which in exchange for certain guarantees England engaged to procure an adequate barrier on the side of the Netherlands.

Barrington (bár'ing-ton), DAINES, son of Viscount Barrington, lawyer, antiquarian, and naturalist; born in 1727; died in 1800. He wrote many papers for the Royal Society and the Society of Antiquaries; published some separate works, and was a correspondent of White of Selborne.

Barrister (bár'is-tér), in England or Ireland, an advocate or pleader, who has been admitted by one of the Inns of Court, viz., the Inner Temple, Middle Temple, Lincoln's Inn, or Gray's Inn, to plead at the bar. It is they who speak before all the higher courts, being instructed in regard to the case they have in hand by means of the brief which they receive from the solicitor who may happen to engage their services. Barristers are sometimes called *utter or outer barristers*, to distinguish them from the king's counsel, who sit within the bar in the courts and are distinguished by a silk gown. Barristers are also spoken of as *counsel*, as in the phrase *opinion of counsel*, that is, a written opinion on a case obtained from a barrister before whom the facts have been laid. All judges are selected from the barristers. A barrister cannot maintain an action for his fees, which are considered purely honorary. A *revising barrister* is a barrister appointed to revise the list of persons in any locality who have a vote for a member of Parliament. The term corresponding to barrister is in Scotland *advocate*, in the United States *counselor-at-law*; but the position of the latter is not quite the same.

Barros (bár'os), JOAO DE, a Portuguese historian; born in 1496. He was attached to the court of King Emmanuel, who, after the publication in 1520 of Barros's romance, *The Emperor Clarimond*, urged him to undertake a history of the Portuguese in India, which appeared thirty-two years later. King John III appointed Barros governor of the Portuguese settlements in Guinea, and general agent for these colonies, further presenting him in 1530 with the

province of Maranhão in Brasil, for purpose of colonization. For his loyalty by the last enterprise the king indemnified him, and he died in retirement in 1571. Besides his standard work, *Asia Portuguesa*, he wrote a moral dialogue on promise and the first Portuguese Grammar.

Barrosa (bar-ró'sa), a village in Andalusia, Spain, near the s.w. coast when abandoned by the Spaniards, defeated a superior French force in 1811.

Barrow (bar'rō), a river in the south-east of Ireland, province of Louth, rising on the borders of the King's and Queen's Counties, and after a southerly course joining the Suir in forming Waterford harbor. It is next in importance to the Shannon, and is navigable for vessels of 200 tons for 25 miles above the sea.

Barrow, ISAAC, an eminent English mathematician and divine, born in London in 1630, studied at the Charterhouse and at Trinity College, Cambridge, of which he became a fellow in 1649. After a course of medical studies he turned to divinity, mathematics, and astronomy, graduated at Oxford in 1652, and, failing to obtain the Cambridge Greek professorship, went abroad. In 1659 he was ordained; in 1660 elected Greek professor at Cambridge; in 1662 professor of geometry in Gresham College; and in 1663 Lucasian professor of mathematics at Cambridge, post which he resigned to Newton in 1669. In 1670 he was created D.D., in 1671 master of Trinity College, and in 1675, vice-chancellor of Cambridge University. He died in 1677. His principal mathematical works (written in Latin) were: *Euclidis Elementa*, 1655; *Euclidis Data*, 1657; *Mathematicæ Lectiones*, 1664; *Lectiones Opticæ*, 1669; *Lectiones Geometricæ*, 1670; *Archimedis Opera*; *Apollonii Conicorum*, lib. iv. *Theodosii Spherica*, 1675. All his English works, which are theological, were left in MS., and published by Dr. Tillotson in 1685. As a mathematician Barrow was deemed inferior only to Newton.

Barrow, SIR JOHN, geographer and a man of letters, born in 1764 in Lancashire. At the age of sixteen he went in a whaler to Greenland; was subsequently teacher of mathematics in a school at Greenwich; and was sent with Lord Macartney in his embassy to China in 1792. His knowledge of Chinese affairs was highly esteemed by the British government. The account of this journey was of great value, and not less so was the account of his travels

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in South Africa, whither he went in 1797 as secretary to Macartney. In 1804 he was appointed second secretary to the admiralty, a post occupied by him for forty years. In 1835 he was made a baronet; and he died in 1848, three years after his retirement. Besides the accounts of his own travels he published lives of Earl Macartney, Lord Anson, Lord Howe, and Drake; *Voyages of Discovery and Research within the Arctic Regions*; an autobiography of himself written at the age of eighty-three, etc.

Barrow-in-Furness, a seaport and parliamentary borough of Lancashire, in the district of Furness, opposite the island of Walney, a town that had increased from a fishing hamlet with 100 inhabitants in 1848 to a town of 63,775 inhabitants in 1911. Its prosperity is due to the mines of red hematite iron-ore which abounds in the district, and to the railway rendering its excellent natural harbor available. It has several large docks, and an extensive trade in timber, cattle, grain, flour, iron-ore and pig-iron. It has numerous blast-furnaces, and one of the largest Bessemer-steel works in the world. Besides iron-works a large business is done in shipbuilding, the making of railway wagons and rolling stock, ropes, sails, bricks, etc. Pop. in 1918, 80,000.

Barrows, SAMUEL JUNE (1845-1900), an American clergyman and author, born in New York. He was engaged in newspaper work for a time and became private secretary to William H. Seward in 1867. He entered the Harvard Divinity School in 1871, graduating in 1874. In 1873, while acting as a correspondent for the *New York Tribune*, he accompanied General Stanley's Yellow-stone expedition, and in the following year accompanied General Custer's Black Hills expedition. In 1876 he became pastor of the First Unitarian Church, Dorchester, Mass., remaining there till 1881, when he became editor of the *Christian Register*. In 1897 he was elected to Congress from the 10th Massachusetts district. Among his published works are *The Doom of the Majority of Mankind*, *Shaybacks in Camp*, *Crimes and Misdemeanors in the United States*, *Isles and Shrines of Greece*.

Barrows, mounds of earth or stones raised to mark the resting place of the dead, and distinguished, according to their shape, as *long*, *bowl*, *veil*, *cone*, *broad barrows*. The practice of barrow-burial is of unknown antiquity and almost universal, barrows being found all over Europe, in Northern Africa, Asia Minor, and elsewhere in Asia, and North America. In the earliest barrows the inclosed bodies were

simply laid upon the ground, with stone or bone implements and weapons beside them. In barrows of later date the remains are generally inclosed in a stone cist. Frequently cremation preceded the erection of the barrow, the ashes being inclosed in an urn or cist.

Barrow Strait, the connecting channel between Lancaster Sound and Baffin Bay on the E. and Melville Sound on the W. Of great depth, with rocky and rugged shores. Named after Sir John Barrow.

Barry (bar'i), in Heraldry, the term applied to a shield which is divided transversely into four, six or more equal parts, the tincture of which it consists being disposed interchangeably. *Barry* is when the shield is divided into four, six or more equal parts by diagonal lines, the tincture of which it consists being varied interchangeably. *Barry-bendy* is where the shield is both barred and bended, dividing the field into lozenge shapes. *Barry-pily* is where the shield is divided by bars and diagonal lines into piles or wedge shapes.

Barry, SIR CHARLES, an English architect, born at London in 1795. After executing numerous important buildings, such as the Reform Club-house, London, King Edward's School, Birmingham, etc., he was appointed architect of the new Houses of Parliament at Westminster, a noble pile, with the execution of which he was mainly occupied for more than twenty years. He was knighted in 1852, and died suddenly in 1860. His son, EDWARD MIDDLETON, R. A. (1830-1880), was also a distinguished architect, and produced many important buildings.

Barry, COMTESSE DU. See *Du Barry*.

Barry Cornwall, the assumed name of Bryan Waller Procter.

Barry, JAMES, a painter and writer, born at Cork, Ireland, in 1741, studied abroad with the aid of Burke; was elected Royal Academician on his return; and worked seven years on the paintings for the hall of the Society for the Encouragement of the Arts. In 1773 he published his *Inquiry into the Real and Imaginary Obstructions to the Increase of the Arts in England*; and in 1782 was elected professor of painting to the Academy. He was expelled in 1797 on the ground of his authorship of the *Letter to the Society of Dilettanti*. His chief painting was his *Victors at Olympia*. He died in 1806.

Barry, JOHN, a naval officer of the American revolution, born in

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out from Tripoli in February, 1850, in spite of the death both of Richard and Overweg, Barth did not return to Tripoli till the autumn of 1855. His exploration, which extended over an area of about 2,000,000 square miles, determined the course of the Niger and the true nature of the Sahara. The English account of it was entitled *Travels and Discoveries in North and Central Africa* (5 vols. 1857-58). An important work on the African languages was left unfinished.

Barthélemy (bár-tál-mē), J. JACQUES, a French thor, born in 1716. He was educated der the Jesuits, for holy orders, but clined all offers of clerical promotion ab the rank of *Abbé*. He gained consid able reputé as a worker in philology & archæology; and after his appointm as director of the Royal Cabinet Medals, in 1753, spent some time trav ing in Italy, collecting medals and tiquities. His best-known work, inaply characterized by himself as unwieldy compilation, was the *Trav of the Younger Anacharsis in Gree*. It was very popular and was transla into various tongues. Though taking part in the revolution he was arre on a charge of aristocracy in 1793, l was set at liberty, and subsequently ferred the post of librarian of the N tional Library. He died in 1795.

Barthélmy-Saint-Hilaire (b. a. tal-m sap-tê-lâr), JULES, a French scholar, statesman, born in 1805; died in 1880. He was professor of Greek and Latin philosophy in the College of France, resigned the chair after the coup d'état of 1852 and refused to take the oath of 1862; in 1869 was turned to the Corps Législatif; after the revolution was a member of the National Assembly; was elected senator for life in 1875. He published a translation of Aristotle, and works on Buddhism, Mohammed and Mohammedanism, the Vedas, etc.

Barthez (bär-tä), PAUL JOSEPH, an eminent French physician, born at Montpellier 1734; died 1806. At Montpellier he founded a medical school which acquired a reputation throughout all Europe. Having settled in Paris he was appointed by the king consulting physician, and by the Duke of Orleans his first physician. The revolution deprived him of the greatest part of his fortune and drove him from Paris, but Napoleon brought him forth again, and loaded him in his advanced age with dignities. Among his numerous writings

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Barth (bärt). HEINEICH, an African traveler, born at Hamburg in 1821; died in 1865. He was graduated at the University of Berlin as Ph.D. in 1844; and set out in 1845 to explore all the countries bordering on the Mediterranean. The first volume of his *Wanderungen durch die Küstenländer des Mittelmeeres* was published in 1849 in which year he was invited by the English government to join Dr. Overweg in accompanying Richardson's expedition to Central Africa. The expedition set

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may be mentioned *Nouvelle Mécanique des Mouvements de l'Homme et des Animaux; Traitement des Maladies Goutteuses; Consultations de Médecine*, etc.

Bartholdi (bär-to'l'dè), AUGUSTE, a French sculptor, born in 1833; best known as the artist of the colossal statue of *Liberty Enlightening the World*, erected on one of the islands in the harbor of New York. Died October 4, 1904.

Bartholin (bär'to-lin), KASPAR, a Swedish writer, born in 1585; died in 1629. He studied medicine, philosophy, and theology; was made Doctor of Medicine at Basel in 1610, rector of the University of Copenhagen 1618, and professor of theology 1624. His *Institutiones Anatomicæ* was for long a standard text-book in the universities. His son, THOMAS, born at Copenhagen 1616, died 1680, was equally celebrated as a philologist, naturalist, and physician. He was professor of anatomy at Copenhagen, 1648; physician to the king, Christian V, in 1670, and counselor of state, 1675. His sons, KASPAR (born 1655; died 1738) and THOMAS (born 1659; died 1690) were also highly distinguished—the first as an anatomist, the other as an archaeologist. The former's name is associated with the description of one of the ducts of the sublingual gland and of the *glandula Bartholini*.

Bartholomew (bar-thol'ō-mū), the apostle, is probably the same person as *Nathanael*, mentioned in the Gospel of St. John as an upright Israelite and one of the first disciples of Jesus. He is said to have taught Christianity in the south of Arabia, and was, according to Eusebius, flayed alive and crucified head downwards at Albanopolis in Armenia. The ancient church had an apocryphal gospel bearing his name, of which nothing has been preserved. A festival is held to his memory on August 24 in the Anglican and Roman churches, June 11 in the Greek Church.

Bartholomew, St., an island, one of the West Indies, in the Leeward group, belonging to France, to which it was transferred by Sweden in 1878; about 24 miles in circumference. It produces some tobacco, sugar, cotton, indigo, etc. Pop. about 3000. The capital is Gustavia.

Bartholomew Fair, a celebrated fair, established in the reign of Henry I, formerly held in West Smithfield, London, on St. Bartholomew's Day (August 24, o. s.), but abolished since 1855.

Bartholomew's Day, St., a feast of the

Bartholomew's Hospital

Church of Rome, celebrated (August 24) in honor of St. Bartholomew.

Bartholomew, St., Massacre of, the slaughter of the French Protestants or Huguenots, which began in Paris on 24th August, 1572, under secret orders from Charles IX, at the instigation of his mother, Catharine de' Medici, and in which, according to Sully, 70,000 Huguenots, including women and children, were murdered in France. Atrocious as the matter was, recent research has shown this figure to be a gross exaggeration. During the minority of Charles and the regency of his mother a long war raged in France between the Catholics and Huguenots, the leaders of the latter being the Prince of Condé and Admiral Coligny. In 1570 overtures were made by the court to the Huguenots, which resulted in a treaty of peace. The king appeared to have entirely disengaged himself from the influence of the Guises and his mother; he invited Coligny to his court, and honored him as a father. It is probable that the queen mother premeditated the murder of the admiral and other leaders of his party, but not a general massacre. The king's sister had just been married to Henry, King of Navarre. On Aug. 22 a shot from a window wounded the admiral. The following night Catharine held the bloody council, which fixed the execution for the night of St. Bartholomew, Aug. 24, 1572. After the assassination of Coligny a bell from the tower of St. Germain l'Auxerrois at midnight gave to the assembled companies of burghers the signal for the general massacre of the Huguenots. The Prince of Condé and the King of Navarre saved their lives by going to mass and pretending to embrace the Catholic religion. By the king's orders the massacre was extended throughout the whole kingdom; and the horrible slaughter continued for thirty days in almost all the provinces. There were many illustrious victims, among them being Admiral Coligny, his son-in-law, Charles de Têligny, and the logician Peter Ramus. Catharine de' Medici received the congratulations of all the Catholic powers, and Pope Gregory XIII commanded bonfires to be lighted and a medal to be struck.

Bartholomew's Hospital, ST., one of the great hospitals of London, formerly the priory of St. Bartholomew, and made a hospital by Henry VIII in 1547. On an average, 6000 patients are annually admitted to the hospital, while about 100,000 out-patients are relieved by it. A medical school is attached to it.

Bartizan (bár'ti-zan), a small overhanging turret pierced with one or more apertures for archers, projecting generally from the angles on the top of a tower, or from the parapet, or elsewhere, as in a medieval castle.

Bartlesville (bár'tls-vil), a town of Washington Co., Oklahoma, 30 miles s. w. of Coffeyville, Kansas. It is in a petroleum and natural gas belt, and has smelters, foundries, machine shops, glass, cement and cigar factories, etc. Pop. 14,174.

Bartlett, PAUL WAYLAND, American sculptor, born 1865; son of Truman H. Bartlett, art critic and sculptor. At fifteen years of age began study under Frémiet at Paris. Won a Paris Salon medal in 1887. Among his works are *The Bear Tamer*, in the Metropolitan Museum, New York; equestrian statue of Lafayette, in the Place du Carrousel, Paris, presented by the school children of America to the French Republic; equestrian statue of McClellan, Philadelphia, and sculptures in the Congressional Library at Washington.

Bartolini (bár-to-lé'né), LORENZO, a celebrated Italian sculptor, born in Tuscany about 1778; died in 1850. He studied and worked in Paris, and was patronized by Napoleon. On the fall of the empire he returned to Florence, where he continued to exercise his profession. Among his greater works may be mentioned his groups of *Charity*, and *Hercules and Lichas* and a colossal bust of Napoleon. Bartolini ranks next to Canova among modern Italian sculptors.

Bartolommeo (bár-to-lóm-má'o), FRA. See *Baccio della Porta*.

Bartolozzi (-lot'sé), FRANCESCO, a distinguished engraver, born at Florence in 1725, or, according to others, in 1730; died at Lisbon in 1813. In Venice, in Florence, and in Milan he etched several pieces on sacred subjects, and then went to London, where he received great encouragement. After forty years' residence in London he went to Lisbon on the invitation of the Prince Regent of Portugal to take the superintendence of a school of engravers, and remained there till his death.

Barton, ANDREW, one of Scotland's first great naval commanders; flourished during the reign of James IV, and belonged to a family which for two generations had produced able and successful seamen. After doing considerable damage to English shipping he was killed in an engagement with two ships which had been specially fitted out to fight against him (1511).

Barton, BENJAMIN SMITH, 1776; died 1815. An American physician, naturalist and ethnologist. He wrote *New Views on the Origin of Tribes of America*, etc.

Barton, BERNARD, known as Quaker poet, born at London in 1784; died in 1849. In 1806 he moved to Woodbridge, in Suffolk, where he was long clerk in a bank. He published *Metrical Effusions* (1812); *Poems by an Amateur* (1814); *Poems* (1824); *Napoleon, and other Poems* (1824); *Poetic Vigils* (1824); *Devotional Verses* (1826); *A New Year's Eve, and other Poems* (1828); besides many contributions to the annuals and magazines. His poetry, though deficient in force, is pleasing, fluent, and graceful.

Barton, CLARA, American philanthropist, born at Oxford, Massachusetts, in 1830. She began her career as a teacher, and in 1854 became a clerk in the patent office at Washington. This position she resigned when the Civil War broke out, when she became a volunteer nurse in the army hospitals and on the battlefield. In 1870, during the Franco-German war, she aided the Grand Ducal hospital of Baden in preparing military hospitals, assisted the Red Cross Society, and superintended the distribution of work to the poor of Strasburg in 1871 and of Paris in 1872. At the close of the war, she was decorated with the Golden Cross of Baden and the Iron Cross of Germany. On the organization of the American Red Cross Society in 1881, she was made its president. In 1889 she had charge of movements in behalf of sufferers from the famine at Johnstown, Pa.; in 1892 distributed relief to the Russian famine sufferers; in 1896 personally directed relief measures at the scenes of the Armenian massacre; in 1898 took relief to the Cuban reconcentrados and performed field work during the war with Spain; and in 1900 undertook to direct the relief of sufferers at Galveston, but broke down physically. In 1903 she undertook the reorganization of the Red Cross Society in the United States. She has written *History of the Red Cross in Peace and War*, *American Relief Expedition to Asia Minor*, *Story of My Childhood*, etc. Died in 1912.

Barton, ELIZABETH, a country girl, born at Aldington, in Kent (commonly called the Nun or Maid of Kent), who gained some notoriety in the reign of Henry VIII. She was subject to epileptic fits, and was persuaded by certain priests that she was a prophetess inspired by God. Among other things she prophesied that Henry, if he persisted in his purpose of divorce and second marriage, would not be king for seven months longer, and would die a shameful death.

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and be succeeded by Catherine's daugh-
ter. On arrest she confessed herself an
imposter, and she and six others were
executed April 20, 1534.

Barton, WILLIAM, American soldier,
born in Rhode Island, 1748.
He was lieutenant-colonel in the Rhode
Island militia, and for meritorious service
was made colonel in the Continental army.
Died 1831.

Barton-upon-Humber, a town of
England, in Lincolnshire, on the Humber. It con-
tains two old churches, one of which is
an undoubted specimen of Anglo-Saxon
architecture. Pop. (1911) 6676.

Bartram, JOHN, botanist, born in
Delaware Co., Pennsylvania,
in 1699. He engaged in botanical
study and eventually established a botan-
ical garden on the Schuylkill, near Phila-
delphia, which he enriched with rare
plants, and which is now a public garden.
He was a member of several learned so-
cieties. He died in 1777.—WILLIAM
BARTRAM, his son, born 1739, continued
the studies of his father, and traveled
through the South in search of new plants,
writing a work in description of his jour-
ney, in which he gave an account of the
Creek, Choctaw and Cherokee Indians,
contributing much new matter to the ex-
isting history of those tribes. In 1771 he
settled in Philadelphia, where he died in
1823. He made the most complete list of
American birds before the work of Wilson.

Bartsch (bärch), KARL FRIEDRICH, one
of the most profound students
of the old German and Romance litera-
tures, was born at Sprottau, Germany, in
1832; died in 1888. He studied at Berlin,
Paris, Oxford, etc., and was professor of
philology in Rostock and Heidelberg.
His labors have been of immense service
in elucidating the older literature and
language of his native country as well
as in the field of the Romance tongues.
He edited a great number of German,
Romance and French poems, tales, etc.,
of the early medieval period and pub-
lished various text-books and critical
treatises on the subject of his studies.
Among his publications were editions of
the *Nibelungenlied*, *Walther Von der*
Vogelweide, *Kudrun*, etc.; *Chrestomathie*
de l'ancien Français; *Provençalische*
Lesbuch; translations of Burns, of
Dante, etc.

Baru (bārū), a woolly substance used
for caulking ships, stuffing cush-
ions, etc., found at the base of the leaves
of an East India sago palm.

Baruch (bārūk; literally 'blessed'),
a Hebrew scribe, friend and
assistant to the prophet Jeremiah. At
the captivity, after the destruction of

Jerusalem, Jeremiah and Baruch were
permitted to remain in Palestine, but
were afterwards carried into Egypt, B.C.
588. His subsequent life is unknown.
One of the apocryphal books bears the
name of Baruch. The Council of Trent
gave it a place in the canon, but its
authenticity was not admitted either by
the ancient Jews or the early Christian
fathers.

Barwood, a dyewood obtained from
Baphia nitida, a tall tree
of West Africa. It is chiefly used for
giving orange-red dyes on cotton yarns.
See *Camwood*.

Baryta (ba-rī'ta), oxide of barium,
called also *heavy earth*, from
its being the heaviest of the earths, its
specific gravity being 5.7. It is generally
found in combination with sulphuric and
carbonic acids, forming sulphate and
carbonate of baryta, the former of which
is called *heavy-spar*. Baryta is a gray
powder, has a sharp, caustic, alkaline
taste, and a strong affinity for water,
and forms a hydrate with that element.
It forms white salts with the acids, all
of which are poisonous except the sul-
phate. Several mixtures of sulphate of
baryta and white lead are manufactured,
and are used as white pigments, or it
may be used alone. Carbonate of baryta,
which in the natural state is known as
witherite, is also used as the base of
certain colors. The nitrate is used in
pyrotechny, in the preparation of green
fireworks, the metal barium burning with
a green flame.

Basalt (ba-salt'), a well-known ig-
neous rock occurring in the
ancient trap and the recent volcanic
series of rocks, but most abundantly in
the former. It is a fine-grained heavy,
crystalline rock, consist-
ing of felspar, augite, and
magnetic iron, and some-
times contains a little
olivine. Basalt is amor-
phous, columnar, tabu-
lar, or globular. The
columnar form is straight
or curved, perpendicular
or inclined, sometimes
nearly horizontal; the
diameter of the columns
from 3 to 18 inches,
sometimes with trans-
verse semispherical joints,
in which the convex part of one is in-
serted in the concavity of another; and
the height from 5 feet to 150. The
forms of the columns generally are pen-
tagonal, hexagonal, or octagonal. When
decomposed it is found also in round
masses, either spherical or compressed



Basalt—Giant's
Causeway.

and lenticular. These rounded masses are sometimes composed of concentric layers, with a nucleus, and sometimes of prisms radiating from a center. Fingal's Cave, in the island of Staffa, furnishes a remarkable instance of basaltic columns. The pillars of the Giant's Causeway, Ireland, composed of this stone, and exposed to the roughest sea for ages, have their angles as perfect as those at a distance from the waves. The Pallsades, on the Hudson at New York, are composed of basalt. Basalt often assumes curious and fantastic forms, as for example the mass popularly known as 'Sampson's Ribs' at Arthur's Seat, Edinburgh.

Baschi (bäs'kē), MATTEO, an Italian Minorite friar of the convent of Montefalcone, founder and first general of the Capuchin branch of the Franciscans. He died at Venice in 1552.

Bascinet, BAS'INET or BAS'NET, a light helmet, sometimes with, but more frequently without, a visor, in general use in England and on the Continent during the Middle Ages.

Bascom, JOHN, an American author, born at Genoa, New York, in 1827; graduated at Williams College in 1849 and at Andover Seminary in 1855; professor of rhetoric at Williams College 1855-74; president of the University of Wisconsin 1874-87; afterwards professor of political science at Williams. His works include *Principles of Psychology*, *Philosophy of Religions*, *Ethics*, *Natural Theology*, *The Science of Mind*, etc. Died 1911.

Base (bäs), in architecture, that part of a column between the top of the pedestal and the bottom of the shaft; where there is no pedestal, the part between the bottom of the column and the pavement. The term is also applied to the lower projecting part of the wall of a room, consisting of a plinth and its moldings.

Base, in chemistry, a term applied to the elements or compound substances which unite with acids to form salts.

Base, or BASIS, a term in tactics, signifying the original line on which an offensive army forms; the frontier of a country, a river, or any safe position from which an army takes the field to invade an enemy's country; upon which it depends for its supplies, reinforcements, etc.; to which it sends back its sick and wounded; and upon which it would generally fall back in case of reverse and retreat.

Baseball, a game played with a bat and ball which has obtained a decidedly national character in the United States. It is a development of the New England town-ball and of the

earlier schoolboy game of 'One Old'. In its present essential form it is supposed to have been devised by A. G. Doubleday at Cooperstown, N. Y., in 1839. It was first played by organized baseball clubs in New York in 1843, and spread rapidly in favor both as an amateur and professional game. Professional baseball is systematically organized into leagues of various classes under the control of a central body known as the National Commission. Professional players are also organized into a protective fraternity, which was founded in 1913. The winning teams of the two major leagues (the National League, organized in 1876, and the American League, organized in 1900), compete annually for the 'World's championship'. The game is played by two teams of nine players each, on a field containing a 'diamond' which is square in shape, one side of the square being 90 feet long. The corner of the diamond is known as the home plate; second base is located at opposite corner; looking toward second base from the home plate, the base at right is first base, and that at the third base. The home plate is located near one corner of the field, and 'base lines' running from the home plate to first and third bases are continued to the extremities of the field to mark 'foul lines.' The teams field and alternately, the names and positions of the players on the field being 'catcher' who stands immediately behind the home plate; 'pitcher,' who stands 60 feet from the home plate on a line from the latter to second base; first, second and third basemen, who are located at the respective bases, 'short stop,' who is stationed between the second and third bases, and three 'outfielders' (left, center and right), who stand between the foul lines outside of the diamond. The play of the opposing team bat in turn, stand at the home plate and endeavoring to hit the ball, which is thrown by the pitcher into fair territory but out of the reach of the fielders. By an elaborate system of rules the batters may advance from base to base unless retired in one of several ways by the team in the field. The team continues to bat until three of its players are retired. Each complete circuit of the bases counts a 'run,' the team scoring the greater number of runs winning the game. Ordinarily a game consists of nine 'innings,' an inning including a turn at bat for each team. Scientific pitching of the ball to the batter is of vital importance. Good pitchers have the ability to make a pitched ball curve in various deceptive ways, which, coupled with a puzzling change of speed in pitching the ball, greatly increases the difficulties of the batter.

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Basedow (bā'se-dō), JOHN BERNHARD, German educationalist, born 1723; died 1780. Under the auspices of the Prince of Anhalt-Dessau he opened, in 1774, an educational institution which he called the *Philanthropin*, a school free from sectarian bias, and in which the pupils were to be disciplined in all studies—physical, intellectual, and moral. This school led to the establishment of many similar ones, though Basedow retired from it in 1778. The chief feature of Basedow's system is the full development of the faculties of the young at which he aspired, in pursuance of the notions of Locke and Rousseau.

Basel (bā'zēl); Fr. *Bâle*, a canton and city of Switzerland. The canton borders on Alsace and Baden, has an area of 176 sq. miles and a pop. of 180,000, nearly all speaking German. It is divided into two half-cantons, Basel

the valuable public library, pictures, etc. The industries embrace silk ribbons (8000 hands employed), tanning, paper, aniline dyes, brewing, etc.; and the advantageous position of Basel, a little below where the Rhine becomes navigable and at the terminus of the French and German railways, has made it the emporium of a most important trade. At Basel was signed the treaty of peace between France and Prussia, April 5, and that between France and Spain, July 22, 1795. Pop. 129,470.

Basel, COUNCIL OF, a great non-ecumenical council of the church convoked by Pope Martin V and his successor Eugenius IV. It was opened 14th Dec., 1431, under the presidency of the Cardinal Legate Julian Cesarini of St. Angelo. The objects of its deliberations were to extirpate heresies (that of the Hussites in particular), to unite all Chris-



Basel, from above the Town

city (Basel-stadt) and Basel country (Basel-Landschaft). The former consists of the city and its precincts, the remainder of the canton forming Basel-Landschaft, the capital of which is Liestal. The city of Basel is 43 m. N. of Bern, and consists of two parts on opposite sides of the Rhine, and communicating by three bridges, one of them an ancient wooden structure; in the older portions is irregularly built with narrow streets; has an ancient cathedral, founded 1010, containing the tombs of Erasmus and other eminent persons; a university, founded in 1459; a seminary for missionaries; a museum containing

tian nations under the Catholic Church, to put a stop to wars between Christian princes, and to reform the church. But its first steps towards an absolute assertion of conciliar supremacy were displeasing to the pope, who authorized the cardinal legate to dissolve the council. That body opposed the pretensions of the pope, and, notwithstanding his repeated orders to remove to Italy, continued its deliberations under the protection of the emperor Sigismund, of the German princes, and of France. On the pope continuing to issue bulls for its dissolution the council commenced a formal process against him, and cited him to ap-

pear... r. On his refusal to comply with this demand the council declared him guilty of contumacy, and, after Eugenius had opened a counter-synod at Ferrara, decreed his suspension from the papal chair (Jan. 24, 1438). The removal of Eugenius, however, seemed so impracticable, that some prelates, who till then had been the boldest and most influential speakers in the council, including the Cardinal Legate Julian, left Basel, and went over to the party of Eugenius. The Archbishop of Arles, Cardinal Louis Allemand, was now made first president of the council, and directed its proceedings with much vigor. In May, 1439, it declared Eugenius, on account of his disobedience of its decrees, a heretic, and formally deposed him. Excommunicated by Eugenius, they proceeded, in a regular conclave, to elect the duke Amadeus of Savoy to the papal chair. Felix V—the name he adopted—was acknowledged by only a few princes, cities, and universities. After this the moral power of the council declined; its last formal session was held May 16, 1443, though it was not technically dissolved till May 7, 1449, when it gave in its adhesion to Nicholas V, the successor of Eugenius. The decrees of the Council of Basel are admitted into none of the Roman collections, and are considered of no authority by the Roman lawyers. They were regarded, however, as of authority in points of canon law in France and Germany, as their regulations for the reformation of the church were soon adopted in the pragmatic sanctions of both countries, and, as far as they regarded clerical discipline, were enforced.

Base-level, the lowest level to which a stream is capable of eroding the land, any deeper erosion being prevented by the height of its point of discharge. A base-level plain is produced when its slopes are very gentle and the eroding power of rains and streams has practically ceased.

Base-line, in surveying, a straight line measured with the utmost precision to form the starting-point of the triangulation of a country or district. See also *Base*.

Ba'shan, the name in Scripture for a singularly rich tract of country lying beyond the Jordan between Mount Hermon and the land of Gilead. At the time of the Exodus it was inhabited by Amorites, who were overpowered by the Israelites, and the land assigned to the half-tribe of Manasseh. The district was, and yet is, famous for its oak forests and its cattle. Remains of ancient cities are common.

Bashi (bā-shē') or BATA'NES ISLANDS, a group of islands in the new Sea between Luzon and Formosa, lon. 122° E.; lat. 20° 28' to 20° 50'. They were discovered by the Dampier in 1687, and form a section of the Philippines group. The largest island is Bataan, with a population of 12,000.

Bashi-Bazouks (bash'i-ba-sūks), a regular troop of the Turkish army. They are mostly Asiatics, and have had to be disarmed several times by the regular troops on account of the barbarities by which they have rendered themselves infamous.

Bashkirs (bash'kirs), a tribe of nomads inhabiting the Russian government of Ufa, Orenburg, Perm, and Samara. They formerly roamed about under their princes in Southern Siberia, but in 1757 they voluntarily placed themselves under the Russian scepter. They are nominally Mohammedans, and live by hunting, cattle-rearing, and keeping of bees. They are rude and war-like and partially nomadic. They number about 750,000.

Bashkirtseff (bāsh-kört'sev), MARIE (CONSTANTINOVA), Russian artist and writer, born 1860, of noble parentage. It is recorded of her that she could read Plato and Virgil in the original and write four languages with equal facility. She was accomplished as a musician, and trained as a singer, but losing her voice devoted herself to art. She worked in a studio in Paris and from 1880 to 1884 exhibited in the Salon, where she received a medal of honor. Her health gave way under her labors and the stress of fashionable life, and she died of consumption in 1887. She is perhaps most widely known through her *Journal*, parts of which appeared in 1887.

Basil, a labiate plant. *Ocimum basilicum*, a native of India, is used in cookery, especially in France, and known more particularly as sweet common basil. Bush or lesser basil is *O. minimum*; wild basil belongs to a different genus, *Calamintha clinopodium*.

Basil, ST., called the Great, one of the Greek fathers, was born in Cappadocia, and made in 370 bishop of Caesarea in Cappadocia, where he died in 435. He was distinguished by his efforts for the regulation of clerical discipline, and, above all, his endeavors for the promotion of monastic life. The Greek Church honors him as one of its most illustrious saints, and celebrates his festival on Jan. 1. The vows of obedience, chastity, and poverty framed by St. Basil are essentially the rules of all the orders of Christendom, although he is particularly the father of the eastern, as

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Ocymum ba- India, much in France, as sweet or asser basil is belongs to a *linopodium*. t, one of the born in 329, of Caesarea died in 379. s efforts for discipline, and the promo- reek Church st illustrious tival Janu- ce, chastity, Basil are the orders is particu- tern, as St.

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Basilan (bá-sē-lán'), the principal island of the Sulu Ar-ipelago, now belonging to the Philippines, off the s.w. extremity of Mindanao, from which it is separated by the Strait of Basilan. It is about 42 m. in length by 6 average breadth. Pop. about 27,000.

Basilcan (bas-i-le'an) MANUSCRIPTS, two manuscripts of the Greek New Testament now in the library of Basel. (1) A nearly complete uncial copy of the Gospels of the eighth century; (2) a cursive copy of the whole New Testament except the Apocalypse, tenth century.

Basilian (ba-sil'i-an) LITURGY, that form for celebrating the Eucharist drawn up towards the close of the fourth century by Basil the Great, still used in the Greek Church.

Basilian Monks, monks who strictly follow the rules of St. Basil, chiefly belonging to the Greek Church.

Basilica (ba-sil'i-ka), originally the name applied by the Romans to their public halls, either of justice, of exchange, or other business. The plan of the basilica was usually a rectangle divided into aisles by rows of columns, the middle aisle being the widest, with a semicircular apse at the end,



Basilica of St. Peter, Rome.

in which the tribunal was placed. The ground-plan of these buildings was generally followed in the early Christian churches, which, therefore, long retained the name of basilica, and it is still applied to some of the churches in Rome by way of distinction, and sometimes to other churches built in imitation of the Roman basilicas.

Basilicata (ba-sil-i-ka'tà), also called POTENZA, an Italian province, extending north from the Gulf of Taranto, and corresponding pretty closely with the ancient Lucania. Area 3845 sq. m.; pop. 491,558.

Basilicon (ba-sil'i-kon), a name of several ointments, the chief ingredients of which are wax, pitch, resin, and olive-oil.

Basil'icon Do'ron (the royal gift), the title of a book written by King James I in 1590, containing a collection of precepts of the art of government. It maintains the claim of the king to be sole head of the church. Printed at Edinburgh, 1603.

Basilides (ba-sil'i-dēs), an Alexandrian Gnostic who lived under the reigns of Trajan, Adrian, and Antoninus, but the place of whose birth is unknown. He was well acquainted with Christianity, but mixed it up with the wildest dreams of the Gnostics, peopling the earth and the air with multitudes of *æons*. His disciples (Basilidians) were numerous in Syria, Egypt, Italy, and Gaul, but they are scarcely heard of after the fourth century.

Basilisk (bas'i-lisk), a fabulous creature formerly believed to exist, and variously regarded as a kind of serpent, lizard, or dragon, and sometimes identified with the cockatrice. It inhabited the deserts of Africa, and its breath and even its look was fatal. The name is now applied to a genus of saurian reptiles (*Basiliscus*), belonging to the family Iguanidæ, distinguished by an elevated crest or row of scales, erectible at pleasure, which, like the dorsal fins of some fishes, runs along the whole length of the back and tail. The mitred or hooded basilisk (*B. mitratus*) is especially remarkable for a membranous bag at the back of the head, of the size of a small hen's egg, which can be inflated with air at pleasure. The other species have such hoods also, but of a less size. To this organ they owe their name, which recalls the basilisk of fable, though in reality they are exceedingly harmless and lively creatures. The species of *Basiliscus* are peculiar to America, chiefly inhabiting Central America and Mexico.

Basilus I (ba-sil'i-us), Emperor of the East, born in Macedonia about 820; died in 886. He was of obscure origin, but having succeeded in gaining the favor of the Emperor Michael III, he became his colleague in the empire, 866. After the assassination of Michael in 867, Basilus became emperor. Though he had worked his way to the throne by a series of crimes, he proved an able and equitable sovereign. He drove the Saracens out of Italy in 885 and began the collection of laws called the *Constitutiones Basilicæ*, which was completed by his son Leo.

Basilus II, Emperor of the East, born 958, died 1025. On the death of his father, the Emperor Romanus the Younger, in 963, he was kept out of the succession for twelve years by two usurpers. He began to reign in conjunction with his brother Constantine 975. His reign was almost a continued scene of warfare, his most important struggle being that which resulted in the conquest of Bulgaria, 1018.

Basin (bā'sin), in physical geography, the whole tract of country drained by a river and its tributaries. The line dividing one river basin from another is the watershed, and by tracing the various watersheds we divide each country into its constituent basins. The basin of a loch or sea consists of the basins of all the rivers which run into it.—In geology a basin is any dipping or disposition of strata towards a common axis or center, due to upheaval and subsidence. It is sometimes used almost synonymously with 'formation' to express the deposits lying in a certain cavity or depression in older rocks. The 'Paris basin' and 'London basin' are familiar instances.

Basingstoke (bā'sing-stōk), a town of England, county of Hants, 18 miles N. N. E. from Winchester. It has a good trade in corn, malt, etc., and now gives name to one of the par. divisions of the county. Pop. 11,540.

Baskerville (bas'ker-vil), JOHN, a celebrated English printer and type-founder, born in 1706; died 1775. He settled at Birmingham as a writing-master, subsequently engaged in the manufacture of japanned works, and in 1750 became a printer. From his press came highly-prized editions of ancient and modern classics, Bibles, prayer-books, etc., all beautifully-printed works.

Basket (bas'ket), a vessel or utensil of wickerwork, made of interwoven osiers or willows, rushes, twigs, grasses, etc. The process of basket-making is very simple, and appears to be well known among the very rudest peoples. The ancient Britons excelled in the art, and their baskets were highly prized in Rome.

Basketball, an American game invented in 1891 by James Naismith. It is mostly played indoors between the close of the football and the opening of the baseball season. First played by the Young Men's Christian Association it was rapidly adopted by athletic organizations, schools and colleges, where it is popular with both sexes, with some modifications of the rules for women. Under the present rules the

game is played on a floor 50 by 70 ft. The goals are hammock nets of cord, suspended from metal rings 18 inches in diameter, and placed 10 feet from the ground in the center of the ends of the play space. The game is played by five on each side, with a round ball 30 to 32 inches in circumference. Time of play is divided into 20-minute halves with a rest of five minutes between halves. A goal is made by batting or throwing the ball into the basket of the opposing side and counting 2 points. Goals from fouls (made by a side gaining the ball on a foul committed by the opposing side) count 1 point. The side having the greatest number of points at the close of play wins the game.

Basking-shark (*Selache maxima* or *Cetorhinus maximus*), a species of shark, so named from its habit of basking in the sun at the surface of the water. It reaches a length of 40 feet, and its liver yields a large quantity of oil. It frequents the northern seas, and is known also as sail-fish or sun-fish.

Basques (bāsks), or BISCAYANS, a people of their own language, *Eskara* (Basque), a remarkable race of people dwelling partly in the southwest corner of France, but mostly in the north of Spain adjacent to the Pyrenees. They are probably descendants of the ancient Iberi, who occupied Spain before the Celts. They preserve their ancient language, former manners, and national dances, and make admirable soldiers, especially in guerrilla warfare. Their language is highly polysynthetic, and the connection between it and any other language has as yet been made out. There are four principal dialects, which are not only distinguished by their pronunciation and grammatical structure, but differ even in their vocabularies. The Basques, who number about 600,000, occupy in Spain the provinces of Biscaya, Guipuzcoa, and Alava; in France the département of Bayonne and Mauléon. **Bas-relief** (bā'rē-lēf or bas'rē-lēf), BASS-RELIEF, low relief.



Bas-relief, from the Elgin Marbles.

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mode of sculpturing figures on a flat surface, the figures having a very slight relief or projection from the surface. It is distinguished from *haut-relief* (*altorilievo*), or high relief, in which the figures stand sometimes almost entirely free from the ground. Bas-relief work has been described as 'sculptured painting' from the capability of disposing of

tinguished from the true perches. *L. lupus*, the only British species, called also sea-dace, and from its voracity sea-wolf, migrates in shoals from June onwards, and often ascends rivers; it resembles somewhat the salmon in shape, and is much esteemed for the table, weighing about 15 lbs. *L. lineatus* (*Roccus lineatus*), or striped bass, an American species,



Striped Bass.

groups of figures and exhibiting minor adjuncts, as in a painting.

Bass (bás; from the Italian *basso*, deep, low), in music, the lowest part in the harmony of a musical composition, whether vocal or instrumental. According to some it is the fundamental or most important part, while others regard the melody or highest part in that light. Next to the melody, the bass part is the most striking, the freest and boldest in its movements, and richest in effect.—*Figured bass*, a bass part having the accompanying chords suggested by certain figures written above or below the notes—the most successful system of short-hand scoring at present in use among organists and pianists.—*Fundamental bass*, the lowest note or root of a chord; a bass consisting of a succession of fundamental notes.—*Thorough bass*, the mode or art of expressing chords by means of figures placed over or under a given bass. Figures written over each other indicate that the notes they represent are to be sounded simultaneously, those standing close after each other that they are to be sounded successively. The common chord in its fundamental form is generally left unfigured, and accidentals are indicated by using sharps, naturals, or flats along with the figures.

Bass (bás), the name of a number of fishes of several genera, but originally belonging to a genus of sea-fishes (*Labrax*) of the perch family, dis-

weighing from 25 to 30 lbs., is much used for food, and is also known as rock-fish. Both species occasionally ascend rivers, and attempts have been made to cultivate British bass in fresh-water ponds with success. Two species of black bass (*Micropterus salmoides* and *M. dolomieu*), American fresh-water fishes, are excellent as food and give fine sport to the angler. The former is often called the largemouthed black bass, from the size of its mouth. Both make nests and take great care of their eggs and young. The *Centropristis striatus*, an American sea-fish of the perch family, and weighing 2 to 3 lbs., is known as the sea-bass.

Bass (bás), THE, a remarkable insular trap-rock of Scotland at the mouth of the Firth of Forth, 3 miles from North Berwick, of a circular form, about 1 mile in circumference, rising majestically out of the sea to a height of 313 feet. It pastures a few sheep, and is a great breeding-place of solan-geese. During the persecution of the Covenanters, its castle, long since demolished, was used as a state prison, in which several eminent Covenanters were confined. It was held from 1691 to 1694 with great courage and pertinacity by twenty Jacobites, who in the end capitulated on highly honorable terms.

Bass. See *Basswood*.

Bass, ROBERT PERKINS, forest commissioner and legislator, born at

Chicago, Sept. 1, 1873, was graduated at Harvard Law School in 1898. He engaged in farming and real estate business in New Hampshire, devoting much of his time to the advancement of forestry in that state; was elected to the N. H. House in 1905 and to the Senate in 1909, and was forest commissioner of the state 1906-10. He was an earnest and successful advocate of reform, opposing energetically the railroad domination of the state, and in 1910 was elected governor on a reform ticket.—His brother JOHN FOSTER BASS (born 1866), has been a war correspondent: in Egypt in 1895; in Armenia at time of massacre, 1897; in the Greek war, 1898; in the Spanish-American war, the Philippine insurrection, the Boxer outbreak in China, and the Russo-Japanese war, 1904.

Bassano (bās-sā'nō), a commercial city of North Italy, province of Vicenza, on the Brenta, over which is a covered wooden bridge. It has lofty old walls and an old castle, and has various industries and an active trade. Near Bassano, September 8, 1796, Bonaparte defeated the Austrian general Wurmsier. Pop. 7896.

Bassano (from his birthplace; real name JACOPO DA PONTE), an Italian painter, born 1510; died 1592. He painted historical pieces, landscapes, flowers, etc., and also portraits; and left four sons, who all became painters, Francesco being the most distinguished.

Bassaris (bas'sa-ris) a genus of N. American carnivora representing the civets of the old world.

Bassein (bās-sān'), a town in Lower Burmah, province of Pegu, on both banks of the Bassein River, one of the mouths of the Irrawaddy, and navigable for the largest ships. It has considerable trade, exporting large quantities of rice, and importing coal, salt, cottons, etc. Pop. 30,000.—Bassein District has an area of 4127 sq. m. and a pop. of 383,102.

Bassein (bās-sān'), a decayed town in Hindustan, 28 miles north from Bombay. At the beginning of the 18th century it was a well-built and wealthy city, with over 60,000 inhabitants; it has now about 11,000.

Basselin (bās-lan), OLIVIER, an old French poet or song-writer, born in the Val-de-Vire, Normandy, about the middle of the 14th century; he died in 1418 or 1419. His sprightly songs have given origin and name to the modern Vaudevilles.

Basseliisse (bas-lis) TAPESTRY, a kind of tapestry wrought with a horizontal warp. See *Hauteliisse*.

Basses-Alpes (bās-ālp; 'Lower Alps'), a department of France, on the Italian border. See *Alpes*.

Basses-Pyrénées (bās-pēr-ā-nā-nees'), a French department, bordering on Spain and the Bay of Biscay. See *Pyrénées*.

Bass'et, the name of a game at cards formerly much played, especially in France. It is very similar to the modern *faro*.

Basseterre (bās-tār), two towns in the West Indies.—1. Capital of the island of St. Christopher's at the mouth of a small river, on the south side of the island. Trade considerable. Pop. about 9000.—2. The capital of the island of Guadaloupe. It has no harbor, and the anchorage is unsheltered and exposed to a constant swell. Pop. about 8000.

Basset-horn (bas'set), a musical instrument, now practically obsolete, a sort of clarinet of enlarged dimensions, with a curved and bell-shaped metal end. The compass extends from F below the bass-staff to C on the second ledger-line above the treble. Mozart has several pieces written for the basset-horn.

Bassia (bas'i-a), a genus of tropical trees found in the East Indies and Africa, nat. order Sapotaceae. One species (*B. Parkii*) is supposed to be the shea-tree of Park, the fruit of which yields a kind of butter that is highly valued, and forms an important article of commerce in the interior of Africa. There are several other species, of which *B. longifolia*, or Indian oil-tree, and *B. butyracea*, or Indian butter-tree, are well-known examples, yielding a large quantity of oleaginous or butyraceous matter. The wood is as hard and incombustible as teak.

Bassompierre (bā-sop-pyār), FRANÇOIS DE, Marshal of France, distinguished both as a soldier and a statesman; born 1579, died 1646. In 1602 he made his first campaign against the Duke of Savoy, and he fought with equal distinction in the following year in the imperial army against the Turks. In 1622 Louis XIII appointed him Marshal of France, and he came so much attached to him that Luynes, the declared favorite, sent him on embassies to Spain, Switzerland, and England. After his return he became an object of suspicion to Cardinal Richelieu and was sent to the Bastille in 1634 from which he was not released till 1641 after the death of the cardinal. During

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his detention he occupied himself with writing his memoirs, which shed much light on the events of that time.

Bassoon (ba-sōn'), a musical wind-instrument of the reed order, blown with a bent metal mouthpiece, and holed and keyed like the clarinet. Its compass comprehends three octaves, rising from B flat below the bass-staff. Its diameter at bottom is 2 inches, and for convenience of carriage it is divided into two or more parts, whence its Italian name *fagotto*, a bundle. It serves for the bass among wood wind-instruments, as hautboys, flutes, etc.



Bassoon.

Bassora (bas'ō-ra) or BASRA, a city in Asiatic Turkey, on the west bank of the Shat-el-Arab (the united streams of the Tigris and Euphrates), about 50 miles from its mouth and nearly 300 southeast of Bagdad. The streets are narrow and unpaved. There are many gardens and palm groves, intersected by little canals navigated by small boats at high tide, which rises to a height of 6 ft. The houses are generally mean. A considerable transit trade is carried on here between the Turkish and Persian dominions and India, and since communication by steamer has been established with Bagdad and Bombay the prosperity of the town has greatly increased. The chief exports are dates, camels and horses, wool and wheat; imports coffee, indigo, rice, tissues, etc. Thirty years ago the inhabitants were estimated at 5000; they are now about 40,000; in the middle of last century they were said to number 150,000. The recent substitution of date and wheat cultivation for that of rice has rendered the place much more healthy. The ruins of the ancient and more famous Bassora—founded by Caliph Omar in 636, at one time a center of Arabic literature and learning and regarded as 'the Athens of the East'—lie about 9 miles southwest of the modern town.

Bassora Gum, an inferior kind of gum resembling gum-arabic.

Basso-rilievo. See *Bas-relief*.

Bass Rock. See *Bass*.

Bass Strait, a channel beset with islands, which separates Australia from Tasmania, 120 miles

broad, discovered by George Bass, a surgeon in the royal navy, in 1798.

Basswood, BASS, the American lime-tree or linden (*Tilia Americana*), a tree common in N. America, yielding a light, soft timber.

Bast, the inner bark of exogenous trees, especially of the lime or linden, consisting of several layers of fibers. The manufacture of bast into mats, ropes, shoes, etc., is in some districts of Russia a considerable branch of industry, bast mats, used for packing furniture, covering plants in gardens, etc., being exported in large quantities. Though the term is usually restricted, many of the most important fibers of commerce, such as hemp, flax, jute, etc., are the products of bast or liber.

Bastar (bas-tār'), a feudatory state in Upper Godavari district, Central Provinces of India; area, 13,062 sq. m.; pop. (1901) 306,501. Chief town, Jagdalpur.

Bastard, a child begotten and born out of wedlock; an illegitimate child. By the civil and canon laws and by the law of Scotland (as well as of some of the United States), a bastard becomes legitimate by the intermarriage of the parents at any future time. But by the laws of England a child, to be legitimate, must at least be born after the lawful marriage; it does not require that the child shall be begotten in wedlock, but it is indispensable that it should be born after marriage, no matter how short the time, the law presuming it to be the child of the husband. The only incapacity of a bastard is that he cannot be heir or next of kin to any one save his own issue.

Bastard Bar, more correctly *baton sinister*, the heraldic mark used to indicate illegitimate descent. It is a diminutive of the bend sinister, of which it is one-fourth in width, couped or cut short at the ends, so as not to touch the corners of the shield.



Bastard Bar.

Bastard Cedar. See *Cedrela*.

Bastard Saffron. See *Cedrela*.

Bastia (bās-tē'a), the former capital of the island of Corsica, upon the N. E. coast, 75 miles N. E. of Ajaccio, on a hill slope; badly built, with narrow streets, a strong citadel, and an indifferently harbor; but has some manufactures, a considerable trade in hides, soap, wine, oil, pulse, etc. Pop. (1906) 24,569.

Bastian (bast'yan), ADOLF, a German traveler and ethnologist; born in 1828. He traveled very widely and his numerous writings throw light on almost every subject connected with ethnology or anthropology, as well as psychology, linguistics, non-Christian religions, geography, etc. One of his chief works is *Die Völker des östlichen Asien* ('Peoples of Eastern Asia,' 6 vols., 1866-71). Died 1905.

Bastian (bas'ti-an), HENRY CHARLTON, an English physician and biologist, born at Truro in 1837. He was educated at Falmouth and at University College, London, where he was assistant curator in the museum in 1860-63. He subsequently studied medicine

into French. His chief works are *Sophismes Economiques*, *Propriété et Loi*, *Justice et Fraternité*, *Protectionisme et Communisme*, *Harmonies Economiques*, etc.

Bastien-Lepage, JULES, a notable painter, born at Damvillers, France, in 1848; died in 1884; a pupil of Alexander Cabanel, best known by his *La Première Communion*, *Jeanne d'Arc* (in the Metropolitan Museum, New York), portraits of Sara Bernhardt, André Theuriet, etc.

Bastille (bás-tél'), a French name for any strong castle provided with towers, but as a proper name the state prison and citadel of Paris, which was built about 1370 by Charles V. I



The Bastille, as in time of Louis XV.

and in 1867 became professor of pathological anatomy in University College. Apart from numerous contributions to medical and other periodicals, and to Quain's *Dictionary of Medicine*, he wrote *The Modes of Origin of Lowest Organisms*; *The Beginnings of Life*; *Evolution and the Origin of Life*; *Lectures on Paralysis from Brain Disease*; and *The Brain as an Organ of Mind*. He became an ardent advocate for spontaneous generation. Died Nov. 18, 1915.

Bastiat (bá-ts-á), FRÉDÉRIC, a French economist and advocate of free trade, born at Bayonne 1801; died at Rome 1850. He became acquainted with Cobden and the English free traders, whose speeches he translated

was ultimately used chiefly for the confinement of persons of rank who had fallen victims to the intrigues of the court or the caprice of the government. (See *Cachet*, *Lettres de*.) The capture of the Bastille by the Parisian mob, 14th July, 1789, was the opening act of the revolution. On that date the Bastille was surrounded by a tumultuous mob, who first attempted to negotiate with the governor Delaunay, but when these negotiations failed, began to attack the fortress. For several hours the mob continued their siege without being able to effect anything more than an entrance into the outer court of the Bastille; but at last the arrival of some of the Royal Guard with a few pieces of artillery

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forced the governor to let down the second drawbridge and admit the populace. The governor was seized, but on the way to the hôtel de ville he was torn from his captors and put to death. The next day the destruction of the Bastille commenced. Not a vestige of it exists, but its site is marked by a column in the Place de la Bastille.

Bastinado (bas-ti-nā'dō), an eastern method of corporal punishment, consisting of blows upon the soles of the feet, applied with a stick.

Bastion (bast'yun), in fortification, a large mass of earth, faced with sods, brick, or stones, standing out from a rampart, of which it is a principal part. A bastion consists of two flanks, each commanding and defending the adjacent curtain, or that portion of the wall extending from one bastion to another, and two faces making with each other an acute angle called the *salient angle*, and commanding the outworks and ground before the fortification. The distance between the two flanks is the *gorge*, or entrance into the bastion. The use of the bastion is to bring every point at the foot of the rampart as much as possible under the guns of the place.

Bastwick (bast'wik), JOHN, an English physician and ecclesiastical controversialist, born in 1593, died 1654. He settled at Colchester, but instead of confining himself to his profession, entered keenly into theological controversy, and was condemned by the Star Chamber for his books against Prelacy: *Elenchus Religionis Papisticae*, *Flagellum Pontificis*, and *The Letanie of Dr J. Bastwick*. With Prynne and Burton he was sentenced to lose his ears in the pillory, to pay a fine of \$25,000, and to be imprisoned for life. He was released by the Long Parliament, and entered London in triumph with Prynne and Burton. He appears to have continued his controversies to the very last with the Independents and others.

Basutoland (ba-sū'tō-land), a division of British South Africa, enclosed between Orange River Colony, Natal, Griqualand East, and Cape Colony. The Basutos belong chiefly to the great stem of the Bechuanas, and have made greater advances in civilization than perhaps any other South African race. In 1868 the Basutos, who had lived under a semi-protectorate of the British since 1848, were proclaimed British subjects, their country placed under the government of an agent, and in 1871 it was joined to

Cape Colony. In 1880 the attempted enforcement of an act passed for the disarmament of the native tribes was the cause of repeated revolts, which the Cape forces were unable to put down. When peace was restored Basutoland was disannexed from Cape Colony (1884), and is now a crown colony of Great Britain. Basutoland has an area of about 10,300 sq. miles, much of it covered with grass, and there is but little wood. The climate is pleasant. The natives keep cattle, sheep, and horses, cultivate the ground, and export grain. It is divided into seven districts, each presided over by a magistrate. Pop. (1904) 348,848, few of them Europeans.

Bat, one of the group of wing-handed, flying mammals, having the forelimb peculiarly modified so as to serve for flight, and constituting the order *Chiroptera*. Bats are animals of the



Great Horseshoe Bat (*Rhinolophus ferrum equinum*).

twilight and darkness, and are common in temperate and warm regions, but are most numerous and largest in the tropics. All European bats are small, and have a mouse-like skin. Many bats are remarkable for having a singular



Skeleton and Outline of Bat (*Phyllostoma hastatum*).

nasal cutaneous appendage, bearing in some cases a fancied resemblance to a horse-shoe. Bats may be conveniently divided into two sections—the insectivorous or carnivorous, comprising all

European and most African and American species; and the fruit-eating, belonging to tropical Asia and Australia, with several African forms. An Australian fruit-eating bat (*Pteropus edulis*), commonly known as the kalong or flying-fox, is the largest of all the bats; it does much mischief in orchards. At least two species of South American bats are known to suck the blood of other mammals, and thence are called 'vampire-bats' (though this name has also been given to a species not guilty of this habit). The best known is the *Desmodus rufus* of Brazil, Chile, etc. As winter approaches, in cold climates bats seek shelter in caverns, vaults, ruinous and deserted buildings, and similar retreats, where they cling together in large clusters, hanging head downwards by the feet, and remain in a torpid condition until the returning spring recalls them to active exertions. Bats bring forth one and sometimes two young, which, while suckling, remain closely attached to the mother's teats, which are two, situated upon the chest. The parent shows a strong degree of attachment for her offspring, and, when they are captured, will follow them, and even submit to captivity herself rather than forsake her charge.

Batalha (bá-tál'yá), a village in Portugal, 69 miles north of Lisbon, with a renowned convent of Dominicans, a splendid building.

Batangas (bá-tán'gás), a town of the Philippines, in the island Luzon, capital of a province of same name, 58 miles s. of Manila. Pop. 33,131.

Bata'tas. See *Sweet Potato*.

Bat'avi. See *Batavians*.

Batavia (ba-tá'vi-a), a city and seaport of Java, on the north coast of the island, the capital of all the Dutch East Indies. It is situated on a wide, deep bay, the principal warehouses and offices of the Europeans, the Java Bank, the exchange, etc., being in the old town, which is built on a low, marshy plain near the sea, intersected with canals and very unhealthy; while the Europeans reside in a new and much healthier quarter. Batavia has a large trade, sugar being the chief export. It was founded by the Dutch in 1619, and attained its greatest prosperity in the beginning of the eighteenth century. Here is one of the most magnificent botanical gardens of the world. Its inhabitants are chiefly Malay, with a considerable admixture of Chinese and a

small number of Europeans. Pop. 115,887.

Batavia, a city, capital of Genesee Co., New York, 36 miles northeast of Buffalo by rail. It has large manufactories of harvesting machinery and plows, also shotguns, shoes, etc. It is the seat of the State Institution for the blind. Pop. 11,613.

Batavians, an old German nation, which inhabited a part of the present Holland, especially the island called *Batavia*, formed by the branch of the Rhine which empties itself into the sea near Leyden, together with the Waal and the Maas. Tacitus asserts them to have been a branch of the Catti. They were subdued by Germanicus, and were granted special privileges for their faithful services to the Romans, but revolted under Vespasian. They were, however, again subjected to Trajan and Adrian, and at the end of the third century the Salian Franks obtained possession of the island of Batavia.

Batchian. See *Bachian*.

Bath (báth), a city of England, Somersetshire, on the Avon, which is navigable for barges from Bristol. The Abbey Church ranks as one of the finest specimens of perpendicular Gothic architecture. Bath is remarkable for its medicinal waters, the four principal springs yielding no less than 184,000 gallons of water a day, and the baths are both handsome and commodious. The temperature of the springs varies from 109° to 117° Fahrenheit. They contain carbonic acid, chloride of sodium and of magnesium sulphate of soda, carbonate and sulphate of lime, etc. Bath was founded by the Romans, and called by them *Aquæ Sulis* from a British goddess. Amongst the Roman remains discovered here have been some fine baths. The height of its prosperity was reached, however, in the 18th century, when Beau Nash was leader of the fashion and master of its ceremonies. Since then, though still attracts large numbers of visitors, it has become the resort of valetudinarians chiefly. Pop. (1911) to 50,720.

Bath, a seaport city of Maine, on the west side and at the head of the winter navigation of the Kennebec, 12 miles from the sea. Chief industries: shipbuilding and allied crafts. It has a soldiers' and sailors' orphan home. Pop. 11,527.

Bath, the immersion of the body in water or an apparatus for this purpose. The use of the bath as a

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institution apart from occasional immersion in rivers or the sea is, as might be anticipated, an exceedingly old custom. Homer mentions the bath as one of the first refreshments offered to a guest; thus, when Ulysses enters the palace of Circe a bath is prepared for him, and he is anointed after it with costly perfumes. No representation, however, of a bath as we understand it is given upon the Greek vases, bathers being represented either simply washing at an elevated basin or having water poured over them from above. In later times, rooms, both public and private, were built expressly for bathing, the public baths of the Greeks being mostly connected with the gymnasia. Apparently, by an inversion of the later practice, it was customary in the Homeric epoch to take first a cold and then a hot bath; but the Lacedæmonians substituted the hot-air sudorific bath, as less enervating than warm water, and in Athens at the time of Demosthenes and Socrates the warm bath was considered by the more rigorous as an effeminate custom. The fullest details we have with respect to the bathing of the ancients apply to its luxurious development under the Romans. Their bathing establishments consisted of four main sections: the undressing room, with an adjoining chamber in which the bathers were anointed; a cold room with provision for a cold bath; a room heated moderately to serve as a preparation for the highest and lowest temperatures; and the sweating-room, at one extremity of which was a vapor-bath and at the other an ordinary hot bath. After going through the entire course both the Greeks and Romans made use of strigils or scrapers, either of horn or metal, to remove perspiration, oil, and impurities from the skin. Connected with the bath were walks, covered race-grounds, tennis-courts, and gardens, the whole, both in the external and internal decorations, being frequently on a palatial scale. The group of the Laocoon and the Farnese Hercules were both found in the ruins of Roman baths. With respect to modern baths, that commonly in use in Russia consists of a single hall, built of wood, in the midst of which is a metal oven covered with heated stones, and surrounded with broad benches, on which the bathers take their places. Cold water is then poured upon the heated stones, and a thick, hot steam rises, which causes the sweat to issue from the whole body. The bather is then gently whipped with wet birch rods, rubbed with soap, and washed with

lukewarm and cold water; of the latter, some pailfuls are poured over his head; or else he leaps, immediately after this sweating-bath, into a river or pond, or rolls in the snow. The Turks, by their religion, are obliged to make repeated ablutions daily, and for this purpose there is, in every city, a public bath connected with a mosque. A favorite bath among them, however, is a modification of the hot-air sudorific bath of the ancients introduced under the name of 'Turkish' into other than Mohammedan countries. A regular accompaniment of this bath, when properly given, is the operation known as 'kneading,' generally performed at the close of the sweating process, after the final rubbing of the bather with soap, and consisting in a systematic pressing and squeezing of the whole body, stretching the limbs, and manipulating all the joints as well as the fleshy and muscular parts. Public baths are now common in the United States. There are also numerous 'hot springs' in nearly every section. Among the most famous are those at Hot Springs, in Garland Co., Arkansas, resorted to by invalids for the cure of rheumatism and similar complaints. There are here from seventy-five to one hundred springs, varying in temperature from 105° to 160°, issuing from a lofty ridge of sandstone overlooking the town, while others rise in the bed of the stream near by.

The principal natural warm baths in England are at Bath and Bristol in Somersetshire, and Buxton and Matlock in Derbyshire. The baths of Harrogate, which are strongly impregnated with sulphuretted hydrogen gas, are also of great repute for the cure of obstinate cutaneous diseases, indurations of the glands, etc. The most celebrated natural hot baths in Europe are those of Aix-la-Chapelle, and the various Baden in Germany; Toeplitz, in Bohemia; Bagnières, Barèges, and Dax, in the south of France; and Spa, in Belgium. Besides the various kinds of water-bath with or without medication or natural mineral ingredients, there are also milk, oil, wine, earth, sand, mud, and electric baths, smoke-baths and gas-baths; but these are as a rule only indulged after specific prescription.

The use of the cold bath in clinical practice has taken a prominent place in the teaching of modern medicine, its chief hydrotherapeutic application being in the reduction of hyperpyrexia in the various forms of fever. It was first successfully introduced in Germany, and now its adoption is almost universal, being part

of the technique of nearly all hospital treatment.

The electrical bath is in common use, its distinctive feature being an electric current passed through the water used for bathing. Baths of compressed air, supposed to be possessed of some therapeutic value, were formerly employed, the patient being subjected to a pressure of two or three atmospheres. Vegetable baths in great variety have been frequently tried by persons seeking real or fancied remedial properties in their use. Lees of wine undergoing fermentation was one form of the vegetable bath; seaweed was another, being added to the water under the idea that the iodine it contained might be conveyed to the system. A distillation of pine leaves is one of the most popular adjuncts in the preparation of the vegetable bath. Animal substances used for baths, also employed for their supposed therapeutic action, have been varied and curious. Baths of milk have been mentioned, but it is authentically recorded that baths of blood and even human blood have been indulged in, doubtless during decadent social periods.

Heliotherapy, is the method of treating diseases by exposing the naked body to the sun's rays. It has been found particularly helpful for tuberculosis of the bones and joints, though it has been employed with success in other diseases also, including acute rheumatism and even certain affections of the eye. Coxalgia or white tumor of the knee is not only healed but the joint remains mobile, a result which is said to be lacking where surgery is resorted to. It has been proved to be efficacious in wounds, even when infected, and to hasten the formation of scar-skin in burns. It is claimed that results may be obtained wherever direct sunlight can be had, whether on mountain-top, seacoast, desert, or the roof of a city tenement.

Bath, KNIGHTS OF THE, an order of England, supposed to have been instituted by Henry IV on the day of his coronation, but allowed to lapse after the reign of Charles II till 1725, when George I revived it as a military order. By the book of statutes then prepared the number of knights was limited to the sovereign and thirty-seven knights companions; but the limits of the order were greatly extended in 1815, and again in 1847, when it was opened to civilians.

Bath-brick, a preparation of siliceous earth found in the river Parret in Somersetshire; manufactured into bricks at Bridgewater; used for cleaning knives, etc.

Bathgate (bath'gāt), a town of Scotland, County Linlithgow, having glass works, a distillery, and several grain-mills, and in the vicinity a paraffin works and coal and iron-stone mines. Pop. (1911) 8228.

Bathing. See *Bath*.

Bathometer (bath-om'e-tēr), an instrument for measuring the depth of sea beneath a vessel without casting a line. It is based upon the fact that the attraction exerted upon any given mass of matter on the ship is less when she is afloat than ashore because of the smaller density of seawater as compared with that of earth or rock.

Bathori (bā'to-rē), a Hungarian family which gave Transylvania five princes and Poland one of its greatest kings. The more important members were:—1. STEPHEN, born in 1532, elected Prince of Transylvania in 1571, on the death of Zapolya, and in 1575 King of Poland. He accomplished many internal reforms, recovered the Polish territories in possession of the Czar of Muscovy, and reigned prosperously till his death in 1586.—2. SIGISMUND, nephew of Stephen, educated by the Jesuits, became waiwode or prince of Transylvania in 1581, shook off the Ottoman yoke and had begun to give hopes of reigning gloriously when he resigned his dominions to the emperor Rudolph II, in return for two principalities in Silesia, a cardinal's hat, and a pension. Availing himself, however, of an invitation by the Transylvanians, he returned, and placed himself under the protection of the Porte, but was defeated by the Imperialists in every battle, and finally sent to Prague, where he died almost forgotten in 1613.—3. ELIZABETH, niece of Stephen, King of Poland, and wife of Count Nadasdy, of Hungary. She is said to have bathed in the blood of several hundred young girls in the hope of renewing her youth, and to have committed other enormities. She was finally seized and confined till her death in 1614.

Bat-horse. See *Batman*.

Bathos (bā'thos), a Greek word meaning depth, now used to signify a ludicrous sinking from the elevated to the mean in writing or speech. First used in this sense by Pope.

Bath-stone, a species of English lime-stone, also called *Bath-oolite* and *roc-stone*, from the small rounded grains of which it is composed. It is extensively worked near Bath for building purposes.

Bathurst (bath'urst), a British settlement on the west coast of Africa, on the island of St. Mary's, near the mouth of the Gambia, with a trade in gum, bees'-wax, hides, ivory, gold, rice, cotton and palm-oil. Pop. about 9000, less than a hundred whites.

Bathurst, a town in the western district of New South Wales, on the Macquarie river, with tanneries, railway workshops, breweries, flour-mills, and other industries. The Bathurst gold-fields were discovered in 1851. Pop. 11,000.

Bathurst, county town of Gloucester, New Brunswick, a port of entry with large fisheries. Pop. (1911), 5428.

Bathurst, ALLEN BATHURST, EARL, a distinguished statesman in Queen Anne's reign; born 1684. He took part with Harley and St. John in opposing the influence of Marlborough, was raised to the peerage in 1711, impeached the promoters of the South Sea scheme, opposed the bill against Atterbury, and was a leading antagonist of Walpole. He was created earl in 1772. His name is also associated with those of the leading writers and wits of the day. Died 1775.

Bathurst, HENRY BATHURST, EARL, son of the second earl, a prominent Tory statesman, after whom various capes, islands, and districts were named. Born 1762; in 1807, president of Board of Trade; in 1809 secretary for foreign affairs; and in 1812, secretary for the colonies, a post held by him for sixteen years. He was also president of the council under Wellington, 1828-30. He died in 1834.

Bathurst Island, on the North Australian coast, belonging to South Australia, separated from Melville Island by a narrow strait; triangular in shape, with a wooded area of about 1000 sq. miles.—Also an island in the Arctic Ocean discovered by Parry, E. of Cornwallis and W. of Melville Island, 76° N., 100° W.

Bathyb'ius (Gr. *bathys*, deep, *bios*, life), the name given by Huxley to what he regarded as masses of a very low form of living organism, covering the sea-bottom at great depths, and in such abundance as to form in some places deposits of 30 feet or more in thickness. It has been described as a tenacious, viscid, slimy substance. As the result of investigations made by the 'Challenger' expedition it was established that it was an artificial product composed of gypsum precipitated by the action of alcohol on sea-water.

Bathymeter (ba-thim'e-tēr), BATHYMETRY, the instrument for and the art of measuring the depth of the sea.

Batiste (ba-tēs'), a fine linen cloth made in Flanders and Picardy, named after its inventor Batiste of Cambray. The name is applied also to a fine cotton fabric.

Bat'ley, a borough of England, West Riding of York, about 2 miles from Dewsbury, has large mills for woolen cloth, carpets and shoddy. Pop. (1911) 36,395.

Batman (bat'man or bl'man; from Fr. *bât*, a pack-saddle), in the British army, a person allowed by the government to every company of a regiment on foreign service. His duty is to take charge of the cooking utensils, etc., of the company and he has a bat-horse to convey these utensils from place to place.

Baton (bat'on), a short staff or truncheon, in some cases used as an official badge, as that of a field-marshal. The conductor of an orchestra has a baton for the purpose of directing the performers as to time, etc. In heraldry, what is usually called the 'battard bar,' or 'bar sinister,' is properly a baton sinister. See *Bastard Bar*.

Baton Rouge (rōzh), the capital of Louisiana, on the left bank of the Mississippi 75 miles northwest of New Orleans, with an arsenal, barracks, military hospital, state-house, state university, etc. It has manufactures of lumber, cotton seed products, sugar, etc. Pop. 14,897.

Batoum, or BATUM (bā-tōm'), a port on the east coast of the Black Sea, acquired by Russia by the treaty of Berlin, on condition that its fortifications were dismantled and it were thrown open as a free port. It rapidly grew to be the main outlet for Transcaucasia; its harbor was enlarged for alleged commercial reasons; an arsenal was built outside it; it was connected by a military road with Kars; and finally, in July, 1886, the Russian government declared it to be a free port no longer. Its importance as a naval and military station to Russia is unquestionably great, and it will probably rank in the future as one of the strongest positions on the Black Sea. The water is of great depth close inshore, and the shipping lies under protection of the overhanging cliffs of the surrounding mountains. Pop. over 30,000.

Batrachians (ba-trā'ki-ans), one of the orders in Cuvier's arrangement of the class *Reptilia*, com-

prising frogs, toads, newts, salamanders, and sirens. The term is now often employed as synonymous with amphibia, but is more usually restricted to the order Anura or tailless amphibia. See *Amphibia*.

Batahian. See *Backian*.

Batta (bat'a), an allowance which military officers in India receive in addition to their pay. It was originally only an occasional allowance, but grew to be a constant practice, and constituted the chief part of Indian over English military emoluments.

Battalion (ba-tal'yun), a body of men arrayed for battle; specifically, a body of infantry. In the United States army as at present organized, a battalion consists of four companies under command of a major. In the British army a battalion is composed of eight companies, and is commanded by a lieutenant-colonel assisted by an adjutant. This applies to the infantry battalion. In some countries the term is extended to the organization of other branches.

Battas, a people belonging to the Malay race inhabiting the valleys and plateaus of the mountains that extend longitudinally through the island of Sumatra. They practise agriculture and cattle-rearing, and are skillful in various handicrafts; they have also a written literature and an alphabet of their own, their books treating of astrology, witchcraft, medicine, war, etc. They are under the rule of hereditary chieftains.

Batten, SIR WILLIAM, a British vice-admiral; died in 1667. During the first Civil war he acted in conjunction with Parliament, but subsequently joined the Royalists.

Battenberg (bat'en-berg), a village in the Prussian prov. of Hesse-Nassau, from which the sons (bymorganatic marriage) of Prince Alexander of Hesse derive their title of princes of Battenberg. One of them, Alexander, was elected Prince of Bulgaria in 1879, but had to abdicate in 1886. Another, Henry, was married to Princess Beatrice of Great Britain in 1885, and was the father of the present queen of Spain. He died while on military duty in Africa, 1896.

Battenberg, or RENAISSANCE LACE, a variety of handsome lace, consisting of braid arranged in a design and sewed together with linen; may contain rings as part of the design. It may be white or colored. Originated in Battenberg.

Battering-ram, an engine for battering down the walls of besieged places. The ancients

employed two different engines of this kind—one a simple beam carried by the soldiers, the other suspended in a frame, often mounted on wheels. They consisted of a beam or spar with a massive metal head, and were set in motion either by a direct application of manual force or by means of cords passing over pulleys. Some were 120 feet or more in length, and worked by 100 men.

Battersea (bat'er-sē), a suburban district of London, in Surrey, on the south bank of the Thames, nearly opposite Chelsea, with a fine public park extending over 185 acres. Pop. 168,907.

Battery (bat'er-i), as a military term, (1) any number of guns grouped in position for action; (2) any work constructed as a position for such guns; (3) the tactical unit of field-artillery, more properly described as a field battery, consisting of the officers, men, horses and guns with all necessary appurtenances. In gun and howitzer batteries there are embrasures through which the firing takes place; but mortar batteries have no openings.—In *battery*, a term signifying a projecting, as a gun, into an embrasure or over a parapet in position for firing. *Cross-batteries* are two batteries which play athwart each other, forming an angle upon the object battered; an *en écharpe battery*, a battery which plays obliquely on the enemy's lines; an *enfilade battery*, a battery which scours or sweeps the whole line of length; an *en revers battery*, one which plays upon the enemy's back.

Battery, in electricity, the term formerly applied to a collection of Leyden jars; but now used of various devices for generating electricity by chemical action. These batteries are divided into two main classes—*primary*, composed of a number of galvanic or voltaic cells in which the electric current is supplied by the dissolving of one of the plates; an *secondary*, or *electric storage battery* (which see), which, unlike the primary battery, may be restored after the exhaustion of the cells, by means of an electric current passed through it from the reverse direction. Batteries are of various construction. In that devised by George Leclanché in 1868, a solid depolarizer employed in the shape of manganese dioxide packed with fragments of carbon into a porous pot around a carbon plate. A zinc rod constitutes the positive plate and the exciting fluid is a solution of ammoniac. The so-called *dry cells* are essentially Leclanché cells, in which the solution is present not as a liquid, but as a paste.

Battery, in criminal law, an assault by beating or wounding a

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Batthyanyi

other. The least touching or meddling with the person of another against his will may be held to constitute a battery.

Batthyanyi (bat-yán'yé), one of the oldest and most celebrated Hungarian families, traceable as far back as the Magyar invasion of Pannonia in the ninth century. Among later bearers of the name have been—COUNT CASIMIR BATTHYANYI, who was associated with Kossuth, was minister of foreign affairs in Hungary during the insurrection of 1849, and died in Paris in 1854; COUNT LOUIS BATTHYANYI, born 1809, of another branch of the family, was leader of the opposition in the Hungarian diet until the breaking out of the commotions of 1848, when he took an active part in promoting the national cause; but on the entry of Windischgrätz into Pesth he was arrested and condemned, 1849.

Battle (bat'l), a combat between two armies. In ancient times and the middle ages the battleground was occasionally chosen by agreement, and the battle was a mere trial of strength, a duel *en gros*. As the armies of the ancients were imperfectly organized, and the combatants fought very little at a distance, after the battle had begun maneuvers were much more difficult, and the troops almost entirely beyond the control of the general. Under these circumstances the battle depended almost wholly upon the previous arrangements and the valor of the troops. In modern times, however, the finest combinations, the most ingenious maneuvers, are rendered possible by the better organization of the armies, and it is often the skill of the general rather than the courage of the soldier that now determines the event of a battle. Battles are distinguished as *offensive* or *defensive* on either side, but there is a natural and ready transition from one method to the other. As a rule, the purely defensive attitude is condemned by tacticians except in cases where the only object desirable is to maintain a position of vital consequence, the weight of precedent being in favor of the dash and momentum of an attacking force even where opposed to superior forces. Where the greatest generals have acted upon the defensive, it has almost always been with desire to develop an opportunity to pass to the offensive, and having discovered their opponent's hand, to marshal against the enemy, exhausted with attack, the whole strength of their resources. Napoleon won more than one great victory by this method, and Wellington's reputation was largely based upon his skill in defensive-offensive operations. Tacticians have

divided a battle into three periods: those of disposition, combat, and the decisive moment. In some measure they require distinct qualities in a commander, the intellect which can plot a disposition being by no means always of the prompt judgment passing to instant action which avails itself of the crucial moment to crush an enemy.

Battle, a town of England, county of Sussex, so named from the battle of Hastings, fought at this site. An abbey built by William the Norman has fallen into ruins, but important remains including portions of the various buildings exist; and there is an old church of great interest. Pop. 2924.

Battle (or **BATTEL**, *VAGER OF*, an obsolete method, according to English law, of deciding civil or criminal cases by personal combat between the parties or their champions in presence of the court. A woman, a priest, a man above 60, or a person physically incapable of fighting, might appear by champion.

Battle Above The Clouds, the name given to that part of the battle of Chattanooga resulting in the capture of Look-out Mountain, Tennessee, on November 24, 1863, by the Federals, who charged up the mountain through a heavy mist.

Battle-axe, a weapon much used in the middle ages among knights. A pole axe is a long-handled battle-axe.

Battle Creek, a city of Michigan, midway between Detroit and Chicago, 45 miles s. w. of Lansing; on both Grand Trunk and Michigan Central main lines; center of a great cereal-food industry. Here is located the Battle Creek Sanitarium, the largest of its kind in the world; and some 200 manufacturing plants. The city is a large producer of cereal foods, threshing machines, tractor engines, steam pumps, printing presses, locomotives, etc. Pop. 26,267.

Battlement, a notched or indented parapet of a fortification formed by a series of raised parts called *cops* or *merlons*, separated by openings called *ornelles* or *embrasures*, the soldier sheltering himself behind the merlon while he fires through the embrasure. Battlements were originally military, but were afterwards used freely in ecclesiastical and civil buildings by way of ornament.

Battue (ba-tü'), a method of killing game by having persons to beat a wood, copse, or other cover, and so drive the animals (pheasants, hares, etc.) towards the spot where sportsmen are stationed to shoot them.

Battue

Battus (bat'tus), the reputed founder of the Greek colony of Cyrene in Libya about 630 B. C.

Batu Khan (ba-tū' kīn), Mongol ruler of the western conquests of his grandfather Genghis Khan from 1224 to 1255, devastating Russia, Poland, Hungary and Dalmatia.

Batum. See *Batoum*.

Bauan (bā-o'ān), a municipality of Batangas, Luzon, Philippine Islands. Pop. 40,000. Town of same name in La Union province. Pop. 10,000.

Baudelaire (bōd-lār), CHARLES PIERRE, a French poet, born 1821. His first work of importance was a series of translations from Poe, ranking among the most perfect translations in any literature. A volume of poems, *Les Fleurs du Mal* (1857), established his reputation as a leader of the romanticists, though the police thought it necessary to deodorize them. Of a higher tone were his *Petits Poèmes en Prose*; followed in 1859 by a monograph on Théophile Gautier, in 1860 by *Les Paradis Artificiels* (opium and hashish studies), and in 1861 by *Wagner and Tannhäuser*. He died in 1867.

Baudry (bō-drē), PAUL JACQUES AIMÉ, a prominent modern French painter, born 1828, son of an artisan. He took the grand prix de Rome in 1850, and exhibited many important works, of which the better known are his *Charlotte Corday* and *La Perle et la Vague*. The decoration of the foyer of the New Opera House at Paris was entrusted to him—an enormous work, occupying a total surface of 500 square meters, but admirably accomplished by him in ten years. Died in 1886.

Bauer (bou'er), BRUNO, a German philosopher, historian, and Biblical critic of the rational school; born in 1809; died in 1882.

Bauer, HAROLD, celebrated pianist; born in London 1873; mother, English; father, German. He was a pupil of Paderewski. His first concert tour was in Russia in 1893. He came to America in 1900 and has given many recitals since then.

Bauer, LOUIS AGRICOLA, an American magnetician, born 1865. Since 1904 director, Department of Terrestrial Magnetism, Carnegie Institute.

Bauhin (bō-an), GASPARD, born at Basel in 1560; in 1582 elected to the Greek chair at Basel, and in 1588 to that of anatomy and botany. He died in 1624. His fame rests chiefly on his *Pinax theatri Botanici* and *Theatrum Botanicum*. Linnaeus gave his name to a

genus of plants. See *Bauhinia*. His name is given to the illececal valve.

Bauhinia (bā-hin'i-a), a genus of plants, order *Leguminosae*, usually twiners, found in the woods of hot countries, and often stretching from tree to tree like cables.

Baum (Boum), FRIEDRICH (?-1777), a German soldier in the British service who fought under General Burgoyne (q. v.) in the Revolutionary war. He was defeated by Colonel Stark and fatally wounded at the battle of Bennington (q. v.), August 16, 1777.

Baumé (bō-mā'), ANTOINE, French practical chemist; born 1728; died 1804. He was the inventor of many useful industrial chemical processes.

Baumgarten (boum'gār-tēn), ALEXANDER GOTTLIEB, a German philosopher, born in 1714 at Berlin; died in 1762. He wrote much on esthetics.

Baur (bour), FERDINAND CHRISTIAN, German theologian, founder of the 'Tübingen School of Theology'; born in 1792. The publication of his first work, *Symbolism and Mythology, or the Natural Religion of Antiquity*, in 1824-25, led to his appointment as professor in the evangelical faculty of Tübingen University, a position occupied by him till his death in 1860. His chief works in the department of the history of Christian dogma are: *The Christian Gnosis, or the Christian Philosophy of Religion* (1835); *The Christian Doctrine of the Atonement* (1838); *The Christian Doctrine of the Trinity and the Incarnation* (1841-43); *The Compendium of and Lectures on the History of Christian Dogmas* (1847-1865). He wrote also a number of works relating to New Testament topics. He believed that the New Testament mainly took form in the second century, the only genuine writings previous to A. D. 70 being the four great Pauline epistles and Revelation.

Bautzen (bout'sen), or BUDISSIN, German town in the kingdom of Saxony, upon a height on the right bank of the Spree, with some of the most interesting buildings. The inhabitants are mostly Lutheran, and both Catholics and Protestants worship in the same cathedral. Chief manufactures: woollen paper, gunpowder, machinery. Napoleon defeated the united armies of the Russians and the Prussians at Bautzen on the 21st May, 1813. Pop. 32,000.

Bauxite (bak'sit), a clay found near Baux, near Arles in France, also in United States, Austria, Italy and Ireland (Co. Antrim), containing a large proportion of alumina, and used as a lining for furnaces, in the preparation

crucibles, etc. It carries from 20 to 40 per cent aluminum (q. v.).

Bavaria (ba-vā'ri-a; German, *Bayern*; French, *Bavière*), a kingdom

in the south of Germany, the second largest state of the empire, composed of two isolated portions, the larger, comprising about eleven-twelfths of the monarchy, having the Austrian territories on the east, and Württemberg, Baden, etc., on the west, while the smaller portion, the Pfalz or Palatinate, is separated from the other by Württemberg and Baden, and lies west of the Rhine; total area, 29,292 sq. m. The principal divisions are: Upper Bavaria, chief town, Munich, capital of the kingdom; Lower Bavaria, Palatinate; Upper Palatinate and Regensburg; Upper Franconia; Middle Franconia; Lower Franconia and Aschaffenburg; Schwaben and Neuburg; the total population being 6,876,497. After Munich the chief towns are Nürnberg, Augsburg, Würzburg, and Ratisbon (Regensburg). The main portion of the kingdom is in most parts hilly; in the south, where it belongs to the Alps, mountainous; but north of the Alps and south of the Danube, which flows east through the country from Ulm to Passau, there is a considerable plateau, averaging about 1600 feet above the sea-level. The south frontier is formed by a branch of the Noric Alps, offsets from which project far into the plateau; principal peaks: the Zugspitze, 9788 ft., and the Watzmann, 8901 ft. The Palatinate is traversed by the northern extremity of the Vosges Mountains, and the scenery is diversified and picturesque. The greater part of the country belongs to the basin of the Danube, which is navigable, its tributaries on the south being the Iller, Lech, Isar, and Inn; on the north, the Wörnitz, Altmühl, Nab, and Regen. The northern portion belongs to the basin of the Main, which receives the Regnitz and Saale, and is a tributary of the Rhine. The Palatinate has only small streams that flow into its boundary river, the Rhine. The chief lakes of Bavaria are all on the higher part of the south plateau; the smaller within the range of the Alps. The Ammer-See is about 10 miles long by $2\frac{1}{4}$ broad, 1736 ft. above the sea; the Wurm-See or Starnberger-See, about 12 miles long by 3 broad, 1899 ft.; and Chiem-See, 9 miles long by 4 to 9 broad, 1651 ft. The climate in general is temperate and healthy, though somewhat colder than the other South German states; yearly average at 47°.

As regards soil, Bavaria is one of the most fertile countries in Germany, pro-

ducing the various cereals in abundance, the best hops in Germany, fruit, wine, tobacco, etc., and having extensive forests. Lower Franconia (the Main valley) and the Palatinate are the great vine-growing districts. The celebrated Steinwein and Renwein are the produce of the slopes of the Steinberg and Marienberg at Würzburg (on the Main). The forests of Bavaria, chiefly fir and pine, yield a large revenue, much timber being annually exported, together with potash, tar, turpentine, etc. The principal mineral products are salt, coal, and iron, some of the mining works belonging to the state. The minerals worked include copper, quicksilver, manganese, cobalt, porcelain clay, alabaster and graphite. Large numbers of horses and cattle are reared, as also sheep and swine. The manufactures are mostly on a small scale. The principal articles manufactured are linens, woollens, cotton, leather, paper, glass, earthen and iron ware, jewelry, etc. The optical and mathematical instruments made are excellent. A most important branch of industry is the brewing of beer. A number of the people maintain themselves by the manufacture of articles in wood, and by felling and hewing timber. The trade of Bavaria is comparatively limited. Principal exports: corn, timber, wine, cattle, glass, hops, fruit, beer, wooden wares, etc. The chief imports are sugar, coffee, cotton, rice, spices, dyestuffs, silk and silk goods, lead, etc. From its position Bavaria has a considerable transit trade. The König Ludwig Canal connects the Main at Bamberg with the Altmühl a short distance above its embouchure in the Danube, thus establishing water communication between the German Ocean and the Black Sea.

Education is in a less satisfactory condition than in most German states. There are three universities, two of which (Munich and Würzburg) are Roman Catholic, and one (Erlangen) Protestant. In art Bavaria is best known as the home of the Nürnberg school, founded about the beginning of the sixteenth century by Albert Dürer. Hans Holbein is also claimed as a Bavarian; and to these have to be added the eminent sculptors Kraft and Vischer, both born about the middle of the fifteenth century. The restoration of the reputation of Bavaria in art was chiefly the work of Ludwig I (1825-48), under whom the capital became one of the most prominent seats of the fine arts in Europe. The religion of the state is Roman Catholicism, which embraces more than seven-tenths of the population, less than three-tenths being Protestants. All

citizens, whatever their creed, possess the same civil and political rights. The dioceses of Bavaria comprise two R.C. archbishoprics, Munich and Bamberg; and six bishoprics, Augsburg, Ratisbon, Eichstätt, Passau, Würzburg, and Spire.

The Bavarian crown is hereditary in the male line. The executive is in the hands of the king. The legislature consists of two chambers—one of senators, composed of princes of the royal family, the great officers of the state, the two archbishops, the heads of certain noble families, and certain members appointed by the crown; the other of deputies, 159 in number, nominated by the electors, who are themselves elected, 1 for every 31,500 of the population. The lower chamber is elected for six years. In time of peace the army is under the command of the King of Bavaria, but in time of war under that of the Emperor of Germany, as commander-in-chief of the whole German army.

History.—The Bavarians take their name from the Boii, a Celtic tribe whose territory was occupied by a confederation of Germanic tribes, called after their predecessors Boiarii. These were made tributary first to the Ostrogoths, and then to the Franks; and on the death of Charlemagne his successors governed the country by lieutenants with the title of margrave, afterwards converted (in 921) into that of duke. In 1070 Bavaria passed to the family of the Guelphs, and in 1180 by imperial grant to Otho, Count of Wittelsbach, founder of the still reigning dynasty. In 1623 the reigning duke was made one of the electors of the empire. Elector Maximilian II joined in the war of the Spanish succession on the side of France, and this led, after the battle of Blenheim, 1704, to the loss of his dominions for the next ten years. His son, Charles Albert, likewise lost his dominions for a time to Austria, but they were all recovered again by Charles's son, Maximilian III (1745). In the wars following the French revolution Bavaria was in a difficult position between France and Austria, but finally joined Napoleon, from whom its elector Maximilian IV. received the title of king (1805), a title afterwards confirmed by the treaties of 1814 and 1815. King Maximilian I was succeeded by his son, Ludwig (or Louis) I under whom various circumstances helped to quicken a desire for political change. Reform being refused, tumults arose in 1848, and Ludwig resigned in favor of his son, Maximilian II, under whom certain modifications of the constitution were carried out. At his death in 1864, he was succeeded by Ludwig II. In

the war of 1866 Bavaria sided with Austria, and was compelled to cede a small portion of its territory to Prussia, and to pay an enormous war indemnity. Soon after Bavaria entered into an alliance with Prussia, and in 1870 joined the Zollverein. In the Franco-German war of 1870-71 the Bavarians took a prominent part, and it was at the request of the King of Bavaria, on behalf of all the other princes and the senates of the free cities of Germany, that the King of Prussia agreed to accept the title of Emperor of Germany. Since January, 1871, Bavaria has been a part of the German Empire, and is represented in the Bundesrath by six, and in the Reichstag by forty-eight members. The eccentricity early displayed by Ludwig II developed to such an extent that in June, 1886, he was placed under control, and a regency established under Prince Luitpold (Leopold). On December 12, 1912, Prince Luitpold's son, Prince Ludwig Leopold, succeeded to the regency, and on November 9, 1913, became king, taking the title of Leopold III.

Bawian (bā-we'an), an island, Dutch East Indies. Pop. 33,000.

Baxter, historian, born 1831; mayor of Portland, Me., 1893-97, 1905-05.

Baxter (baks'tér), RICHARD, the most eminent of the English nonconforming divines of the seventeenth century, born at Rowton, Shropshire, in 1615; ordained in 1638; parish minister of Kidderminster in 1640. The imposition of the oath of universal approbation of the doctrine and discipline of the Church of England (the *et cetera* oath) detached him from the establishment. He then condemned the execution of the king and the election of Cromwell, preached against the Covenant and against separatists and sectaries, but his piety won him the respect of all parties. At the Restoration he became king's chaplain, but declined the bishopric of Hereford, and on the passage of the Act of Uniformity threw in his lot entirely with the nonconformists. In 1685 he was arrested, fined 500 marks by Jeffreys, and imprisoned. After his release he lived in retirement till his death in 1691. He left about 15 treatises, of which his *Saints' Everlasting Rest* and *Call to the Unconverted* have been the most popular.

Baxterians, followers of Baxter in respect of his attempts to compromise between Calvinism and Arminianism. They reject the doctrine of reprobation, admit a universal potential salvation, becoming actual in the case of the elect, and assert the possibility

falling from grace. Exponents: Dr. Watts and Dr. Doddridge.

Bay (bā), the laurel-tree, noble laurel, or sweet-bay (*Laurus nobilis*); but the term is loosely given to many trees and shrubs resembling this. A fatty or fixed oil (used in veterinary medicine) and also a volatile oil is obtained from the berries, but what is called 'bayberry oil' is also obtained from the genus *Myrica* or candleberry. In United States the fragrant-flowered *Magnolia glauca* is called sweet bay, the red bay being *Laurus carolinensis*, the loblolly-bay *Gordonia lasianthus*. See *Laurel*.

Bay, in geography, an indentation of some size into the shore of a sea or lake, generally said to be one with a comparatively wider entrance than a gulf.

Bay, in architecture, a term applied to a recessed division or compartment of a building, as that marked off by buttresses or pillars.

Baya (bā'ya), the weaver-bird (*Ploceus philippinus*), an interesting East Indian passerine bird, somewhat like the bullfinch. Its nest resembles a bottle, and is suspended from the branch of a tree, often over water, where they are safest from monkeys and snakes. The entrance to the nest is a hole at one side. Sometimes the male builds a separate nest for himself.

Bayaderes (bā-a-dēr'), the general European name for the dancing and singing girls of India, some of whom are attached to the services of the Hindu temples, while others travel about and dance at entertainments for hire. Those in the service of the temples are recruited from the Vaisya class, while the others (Nautch girls) are low-caste or slave girls.

Bayamo (bā-yā'mō), or ST. SALVADOR, a town in the east of Cuba, near the Cauto: pop. (1907) 4102.

Bayard (bā-yār), PIERRE DU TERRAIL, SEIGNEUR DE, the *Chevalier sans peur et sans reproche* ('knight without fear and without reproach'), born in 1476 in chateau Bayard, near Grenoble, in southern France. At the age of eighteen he accompanied Charles VII to Italy, and in the battle at Fornova took a standard. At the beginning of the reign of Louis XII, in a battle near Milan, he entered the city at the heels of the fugitives, and was taken prisoner, but dismissed by Ludovico Sforza without ransom. He was the hero of a celebrated combat of thirteen French knights against an equal number of Germans. On one occasion it is said that, singlehanded, he made good the defence of the bridge of the Garigliano against 200 Spaniards.

He distinguished himself equally against the Genoese and the Venetians, and, when Julius II declared himself against France, went to the assistance of the Duke of Ferrara. He was severely wounded at the assault of Brescia, but returned, as soon as cured, to the camp of Gaston de Foix, before Ravenna, and after new exploits was again dangerously wounded in the retreat from Pavia. In the war commenced by Ferdinand the Catholic he displayed the same heroism, and the fatal reverses which embittered the last years of Louis XII only added to the personal glory of Bayard. When Francis I ascended the throne he sent Bayard into Dauphiné to open a passage over the Alps and through Piedmont. Prosper Colonna lay in wait for him, but was made prisoner by Bayard, who immediately after further distinguished himself in the battle of Marignano. After his defence of Mézières against the invading army of Charles V he was saluted in Paris as the savior of his country, receiving the honor paid to a prince of the blood. His presence reduced the revolted Genoese to obedience, but failed to prevent the expulsion of the French after the capture of Lodi. In the retreat the safety of the army was committed to Bayard, who, however, was mortally wounded by a stone from a blunderbuss in protecting the passage of the Sesia. He kissed his sword's cross, confessed to his squire, and died April 30, 1524.

Bayard (bī'ard), THOMAS FRANCIS, statesman, born at Wilmington, Delaware, in 1828, educated at Flushing, studied law, and in 1868 was elected to the United States Senate, where he served till 1884. In 1885 he was made Secretary of State in President Cleveland's cabinet, and on March 30, 1893, was appointed ambassador to England being the first ambassador from the United States, only ministers being appointed previously. He died in 1898.

Bay City, a city in eastern Michigan, on Saginaw Bay, Lake Huron; the county seat of Bay Co. The city is served by the Michigan Central and several other lines of steam railroads, and has on Saginaw River, which divides the city, fifteen miles of dockage for deep-draught vessels. It has an extensive trade in lumber and salt and important fisheries; also growing manufactures. Pop. 45,166.

Bayeux (bā-yeu), an ancient town of France, dep. Calvados, 16 miles N. W. of Caen, with manufactures of lace, calico, and porcelain. In its cathedral, said to be the oldest in Normandy,

was preserved for a long time the famous Bayeux tapestry. Pop. (1906) 6930.

Bayeux Tapestry, so called because it was originally found in the cathedral of Bayeux, in the public library of which town it is still preserved. It is supposed to have been worked by Matilda, queen of William the Conqueror, and to have been presented by Odo, Bishop of Bayeux, the half-brother of William, to the church in which it was found. It is 214 feet in length and 20 inches in breadth, and is divided into seventy-two compartments, the subject of each scene being indicated by a Latin inscription. These scenes give a pictorial history of the invasion and conquest of England by the Normans, beginning with Harold's visit to the Norman court, and ending with his death at Hastings.

Bay Islands, an island group, Bay of Honduras, off N. coast of state of Honduras, incorporated as a British colony in 1852, and ceded to Honduras in 1849, but are practically independent. The largest is Ruatan, 30 miles long.

Bayle (bäl), PIERRE, French critic and miscellaneous writer, the son of a Calvinist preacher, born at Carlat (Languedoc) in 1647, died at Rotterdam 1706. He studied at Toulouse, and was employed for some time as a private tutor at Geneva and Rouen. He went to Paris in 1674, and soon after was appointed professor of philosophy at Sedan. Six years after he removed to Rotterdam, where he filled a similar chair. The appearance of a comet, in 1680, which occasioned an almost universal alarm, induced him to publish, in 1682, his *Pensées Diverses sur la Comète*, a work full of learning, in which he discussed various subjects of metaphysics, morals, theology, history, and politics. It was followed by his *Critique Générale de l'Histoire du Calvinisme de Maimbourg*. This work excited the jealousy of his colleague, the theologian Jurieu, and involved Bayle in many disputes. In 1684 he undertook a periodical work, *Nouvelles de la République des Lettres*, containing notices of new books in theology, philosophy, history, and general literature. This publication, which lasted for three years, added much to his reputation as a philosophical critic. In 1693 Jurieu succeeded in inducing the magistrates of Rotterdam to remove Bayle from his office. He now devoted all his attention to the composition of his *Dictionnaire Historique et Critique*, which he first published in 1696, in two vols. fol. This work, much enlarged, has passed through many editions.

It is a vast storehouse of facts, discussions, and opinions, and though it was publicly censured by the Rotterdam consistory for its frequent impurities, its pervading scepticism, and tacit atheism, it long remained a favorite book both with literary men and with men of the world. The articles in his dictionary, in themselves, are generally of little value, and serve only as a pretext for the notes, in which the author displays, at the same time, his learning and the power of his logic. The best editions are that of 1740, in four vols. fol. (Amsterdam and Leyden), and that in sixteen vols., published in 1820-24 at Paris.

Bay-leaf, the leaf of the sweet bay or laurel-tree (*Laurus nobilis*).

These leaves are aromatic, and are used in cookery and confectionery. See *Bay*.

Baylen (bi-len'). Same as *Bailen*.

Bay'liss, SIR WYKE, artist, born at Madeley, England, in 1835; died in 1906. He was made president of the Royal Society of British Artists 1888 and knighted in 1897. Among his works are *St. Lawrence*, Nuremberg; *The Golden Doumo*, Pisa; *St. Peter's Rome*. He wrote *The Higher Life in Art* and *The Witness of Art*.

Baylor, FRANCES COURTNEY, novelist, born at Fayetteville, Arkansas, in 1848. She is best known by her *On Both Sides*; also wrote *Behind the Blue Ridge*, *Juan and Juanita*, etc.

Bayly (bä'li), THOMAS HAYNES, English poet, novelist, dramatist, and miscellaneous writer, born 1797, died 1839. Educated at Oxford, and intended for the church. He wrote thirty-six pieces for the stage, most of which were successful; several novels: *Aylmers*, *Kinness in Women*, etc.; and numerous songs. As a song writer he was most prolific and most popular: *The Soldier's Tear*, *Woe Met—twas in a Crowd*, and a few others are still well known.

Bay Mahogany, that variety of mahogany exported from Honduras. It is softer and less finely marked than the variety known as Spanish mahogany, but is the largest and most abundant kind.

Baynes (bānz), THOMAS SPENCE, born at Wellington, Somerset, in 1823; died suddenly at London in 1885. He studied under Sir William Hamilton at Edinburgh, and acted as his class assistant from 1851 to 1855. From 1857 to 1863 he was resident in London, where he acted as examiner in logic and mental philosophy in the University of London, and as assistant editor on the *Daily News*. In 1864 he was appointed to the

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chair of logic, rhetoric, and metaphysics in St. Andrews University, a post he held till his death. In 1873 he became editor of the ninth edition of the *Encyclopaedia Britannica*, when his wide acquaintance with men of letters and learning assisted him greatly in the selection of suitable contributors. He translated the *Port Royal Logic*, and was a frequent contributor to the principal reviews and literary journals.

Bay of Islands, a large, deep, and safe harbor on the N. E. coast of the N. Island of New Zealand. It is claimed to have been the seat of the first European settlement in New Zealand.—Also a large bay formed by the Gulf of St. Lawrence, on the west coast of Newfoundland.

Bay-oil, oil from the berries of the bay or laurel. See *Bay*.

Bayonet (bā'ō-net), a straight, sharp-pointed weapon, generally triangular, intended to be fixed upon the muzzle of a rifle or musket, which is thus transformed into a thrusting weapon: probably invented about 1640, in Bayonne. About 1690 the bayonet began to be fastened by means of a socket to the outside of the barrel, instead of being inserted as formerly in the inside. A variety of the bayonet, called the sword-bayonet, is now pretty widely used in modern armies, several modifications of the arm being in use among the armies of the different nations.

Bayonne (bā-yon), a well-built fortified town, the largest in the French dep. Basses-Pyrénées, at the confluence of the Nive and the Adour, about 2 miles from their mouth in the Bay of Biscay; with a citadel commanding the harbor and city, a cathedral—a beautiful ancient building—shipbuilding and other industries, and a considerable trade, the hams of Bayonne being in much request. Among the lower class the Basque language is spoken. It was the scene of the abdication of Charles IV of Spain in favor of Napoleon (1808). In 1814 the British forced the passage of the Nive and invested the town, from which the French made a desperate but unsuccessful sortie. Pop. (1906) 21,779.

Bayonne, a city of Hudson Co., New Jersey, about 6 miles S. W. of New York City. Its geographical position between New York and Newark Bays is favorable for manufacturing. Products include boilers, cables, machinery, copper, brass, iron, launches, boats, petroleum, brass, sulphur, edible oils, essential oils. Pop. (1910) 55,545.

Bayou (bā'yū), in the Southern United States, a stream which flows

from a lake or other stream: frequently used as synonymous with creek or tidal channel.

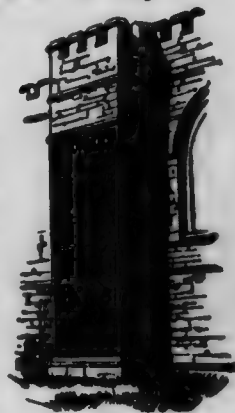
Bayreuth (bi'roit). See *Baireuth*.

Bay Rum, a spirit obtained by distilling the leaves of *Myrcia acris*, or other West Indian trees of the same genus. It is astringent and stimulating and is used for toilet purposes and as a liniment in various affections.

Bay-salt, a general term for coarse-grained salt, but properly applied to salt obtained by spontaneous or natural evaporation of sea-water in large, shallow tanks or *bays*.

Bay-window, a window forming a recess or bay in a

room projecting outwards, and rising from the ground or basement on a plan rectangular, semi-octagonal, or semi-hexagonal, but always straight-sided. The term is however, also often employed to designate a *bow-window*, which more properly forms the segment of a circle, and an *oriel-window*, which is supported on a kind of bracket, and is usually on the first floor.



Bay-window.

Baza (bā'thā), an old town of Spain, Andalusia, prov. of Granada, formerly a large and flourishing city. In 1810 the French, under Marshal Soult, here defeated the Spaniards in a decisive battle. Pop. 12,770.

Bazaar. See *Bazar*.

Bazaine (bā-zān), FRANÇOIS ACHILLE, a French general, born in 1811. He served in Algeria, in Spain against the Carlists, in the Crimean War, and joined the Mexican expedition as general of division in 1862, and in 1864 was made a marshal of France. He commanded the third army corps in the Franco-German War, when he capitulated at Metz, after a seven weeks' siege, with an army of 175,000 men. For this act he was tried by court-martial in 1873, found guilty of treason, and condemned to death. This sentence was commuted to twenty years' seclusion in the Isle St. Marguerite, from which he escaped. Died at Madrid in 1888.

Bazar (ba-sar'), or **BAZAAR**, in the East an exchange, market-place, or place where goods are exposed for sale, usually consisting of small shops or stalls in a narrow street or series of streets. These bazar-streets are frequently shaded by a light material laid from roof to roof, and sometimes are arched over. Marts for the sale of miscellaneous articles, chiefly fancy goods, are now to be found in most European cities bearing the name of *bazars*. The term bazar is also applied to a sale of miscellaneous articles, mostly of fancy work, and contributed gratuitously, in furtherance of some charitable or other purpose.

Bazarjik (ba-sar-jik'), a town of Bulgaria, southeast of Silistria. Has an important annual fair. Pop. about 11,000.

Bazigars (ba-si-gars'), a tribe of East Indians dispersed throughout the whole of Hindustan mostly in wandering tribes. They are divided into seven castes; their chief occupation is that of jugglers, acrobats, and tumblers, in which both males and females are equally skillful. They present many features analogous to the gypsies of Europe.

Bazoche (ba-zoh'), or **BASOCHÉ** (a corruption of *Basilica*), a brotherhood formed by the clerks of the parliament of Paris said to have originated among the class of procureurs or advocates. They had a king, chancellor, and other dignitaries; and certain privileges were granted them by Philip the Fair early in the fourteenth century, as also by subsequent monarchs. They had an annual festival, having as a principal feature dramatic performances in which satirical allusions were freely made to passing events. The representation of these farces or satires was frequently interdicted, but their development had a considerable effect on the dramatic literature of France.

Bdellium (del'i-um), an aromatic gum resin brought chiefly from Africa and India, in pieces of different sizes and figures, externally of a dark reddish brown, internally clear, and not unlike glue. To the taste it is slightly bitterish and pungent; its odor is agreeable. It is used as a perfume and a medicine, being a weak deobstruent. Indian bdellium is the produce of *Balsamodendron Roeburghii*; African of *B. Africanum*; Egyptian bdellium is obtained from the doum palm; and Sicilian is produced by *Daucus gummifer*, a species of the genus to which the carrot belongs. The bdellium mentioned in Gen., ii, was apparently a precious stone, perhaps a pearl.

Beaches (bēch'es), **RAISED**, a term applied to those long terraced level pieces of land, consisting of sand and gravel, and containing marine shells, now, it may be, a considerable distance above and away from the sea, but bearing sufficient evidences of having been at one time sea-beaches. In Scotland such a terrace has been traced extensively along the coasts at about 25 feet above the present sea-level.

Beachy Head (bē'chi), a promontory in the south of England, on the coast of Sussex, rising 575 feet above sea-level, with a revolving light, visible in clear weather from a distance of 28 miles. A naval battle took place here, June 30, 1690, in which a French fleet under Tourville defeated an English and Dutch combined fleet under Lord Torrington.

Beacon (bē'kon), an object visible to some distance, and serving to notify the presence of danger; commonly applied to a fire-signal set on a height to spread the news of hostile invasion or other great event; and also applied to a mark or object of some kind placed conspicuously on a coast or over a rock or shoal at sea for the guidance of vessels, often an iron structure of considerable height.

Beaconsfield (bē'konz-fēld), a village of Buckinghamshire, the parish church of which contains the remains of Edmund Burke, whose seat was in the neighborhood; while a marble monument to the poet Waller, who owned the manor, is in the churchyard. It gave the title earl to the English statesman and novelist Benjamin Disraeli.

Beaconsfield, **BENJAMIN DISRAELI**, **EARL OF**, an eminent English statesman and novelist, of Jewish extraction; eldest son of Isaac D'Israeli, author of the *Curiosities of Literature*; was born in London December 2, 1804. He attended for some time a private school, and was first destined for the law, but showing a decided taste for literature he was allowed to follow his inclination. In 1826 he published *Vivian Grey*, his first novel; and subsequently traveled for some time, visiting Italy, Greece, Turkey, and Syria, and gaining experiences which were afterwards reproduced in his books. His travels and impressions are embodied in a volume of letters addressed to his sister and his father. In 1831 another novel, *The Young Duke*, came from his pen. It was followed at short intervals by *Contarini Fleming*, *Alroy*, *Henrietta Temple*, *Vendigo*, *The Revolutionary Epic* (a poem, etc. In 1832, and on two subsequent

occasions, he appeared as candidate for the representation of High Wycombe, with a program which included vote by ballot and triennial parliaments, but was unsuccessful. His political opinions gradually changed: in 1835 he unsuccessfully contested Taunton as a Tory. In 1837 he gained an entrance to the House of Commons, being elected for Maidstone. His first speech in the house was treated with ridicule; but he finished with the prophetic declaration that the time would come when they would hear him. During his first years in parliament he was a supporter of Peel; but when Peel pledged himself to abolish the corn-laws, Disraeli became the leader of the protectionists. About this time he became a leader of what was known as the 'Young England' party, professing a sort of senti-

chancellor of the exchequer. They immediately brought in, and carried, after a violent and bitter struggle, a Reform Bill on the basis of household suffrage. In 1868 he became premier on the resignation of Lord Derby, but his tenure of office was short. In 1874 he again became prime-minister with a strong Conservative majority, and he remained in power for six years. This period was marked by his elevation to the peerage in 1876 as Earl of Beaconsfield, and by the prominent part he took in regard to the Eastern question and the conclusion of the Treaty of Berlin in 1878. In 1880 parliament was rather suddenly dissolved, and the new parliament showing an overwhelming Liberal majority, he resigned office, though he still retained the leadership of his party. Within a few months of his death the publication of a novel called *Endymion* (his last preceding, *Lothair*, had been published ten years before) showed that his intellect was still vigorous. Among others of his writings besides those already mentioned are: *A Vindication of the English Constitution*, 1834; *Alarcos, a Tragedy*, 1839; and *Lord George Bentinck, a Political Biography*, 1852. He died April 19, 1881.



Lord Beaconsfield.

mental advocacy of feudalism. This spirit showed itself in his two novels of *Coningsby* and *Sybil*, published, respectively, in 1844 and 1845. Having acquired the manor of Hughenden in Buckinghamshire, he was in 1847 elected for this county, and he retained his seat till raised to the peerage nearly thirty years later. His first appointment to office was in 1852, when he became chancellor of the exchequer under Lord Derby. The following year, however, the ministry was defeated. He remained out of office till 1858, when he again became chancellor of the exchequer, and brought in a reform bill which wrecked the government. During the time the Palmerston government was in office Mr. Disraeli led the opposition in the lower house with conspicuous ability and courage. In 1868 the Liberals resigned, and Derby and Disraeli came into power, the latter being again

Bead (bēd), originally a prayer; then a small perforated ball of gold, pearl, amber, glass, or the like, to be strung on a thread, and used in a rosary by Roman Catholics in numbering their prayers, one bead being passed at the end of each ejaculation or short prayer; latterly any such small ornamental body. Glass beads are now the most common sort; they form a considerable item in the African trade.—In architecture and joinery the bead is a small round molding. It is of frequent occurrence in architecture, particularly in the classical styles, and is used in picture-frames and other objects carved in wood.—*St. Cuthbert's Beads*, the popular name of the detached and perforated joints of encrinurites.

Beadle (bē'dl), an officer in a university, whose chief business is to walk with a mace in a public procession; also, a parish officer whose business is to punish petty offenders, and a church officer with various subordinate duties, as waiting on the clergyman, keeping order in church, attending meetings of vestry or session, etc.

Bead-snake (*Elaps fulvius*), a beautiful snake of North America, inhabiting cultivated grounds, especially plantations of the sweet-potato, and burrowing in the ground. It is finely marked with yellow, carmine, and black. Though it possesses poison-fangs, it never seems to use them.

Beagle (bē'gl), a small hound, formerly kept to hunt hares, now almost superseded by the harrier, which sometimes is called by its name. The beagle is smaller than the harrier, compactly built, smooth-haired, and with pendulous ears. The smallest of them are little larger than the lap-dog.

Beam (bēm), a long straight and strong piece of wood, iron, or steel, especially when holding an important place in some structure, and serving for support or consolidation; often equivalent to *girder*. In a balance it is the part from the ends of which the scales are suspended. In a loom it is a cylindrical piece of wood on which weavers wind the warp before weaving; also, the cylinder on which the cloth is rolled as it is woven. In a ship one of the strong transverse pieces stretching across from one side to the other to support the decks and retain the sides at their proper distance: hence a ship is said to be 'on her beam ends' when lying over on her side.

Beam-tree (*Pyrus aria*), a tree of the same genus as the apple, mountain-ash, and service-tree, having berries that are edible when quite mellow, and yielding a hard and fine-grained wood, used for axle-trees and other purposes.

Bean (bēn), a name given to several kinds of leguminous seeds and the plants producing them, probably originally belonging to Asia. They belong to several genera, particularly to *Faba*, garden and field bean; *Phaseolus*, French or kidney bean; and *Dolichos*, tropical bean. The common bean (*F. vulgaris*) is cultivated both in fields and gardens as food for man and beast. There are many varieties in gardens, and the horse or tick bean in fields. The soil that best suits is a strong, rich loam. The seed of the Windsor is fully an inch in diameter; the horse-bean is much less, often not much more than half an inch in length and three-eighths of an inch in diameter. Beans are very nutritious, containing 36 per cent of starch and 23 per cent of nitrogenous matter called legumin, analogous to the casein in *c.* *se.* The bean is an annual, from 2 to 4 feet high. The flowers are beautiful and fragrant. The *kidney-bean*, *French bean*, or *haricot* is the *Phaseolus vulgaris*, a well-known culinary vegetable. There are two principal varieties, annual dwarfs and runners. The beans cultivated in America and largely used as articles of food belong to the genus *Phaseolus*. The *scarlet-runner bean* (*Phaseolus multiflorus*), a native of Mexico, is cultivated on account of its long rough pods and its scarlet flowers.

—*St. Ignatius's bean* is not really a bean but the seed of a large climbing shrub of the order Loganiaceæ, nearly allied to the species of *Strychnos* which produce *nux vomica*.

Bean-goose (*Anser segētum*), a species of wild goose, a migratory bird which arrives in Britain in autumn and retires to the north in the end of April, though some few remain in breed. Being rather smaller than the common wild goose, it is sometimes called the *small gray goose*.

Bean-king, the person chosen king in the Twelfth Night festivities in virtue of having got the piece of cake containing the bean buried in the cake for this purpose.

Bear (bār), the name of several large plantigrade carnivorous mammals of the genus *Ursus*. They belong to the canine branch of carnivores, the dog and the bear having a common ancestor *Amphicyon* of the Miocene Age. Like the dog they have forty-two teeth, but the dental development differs from that of other carnivores in being less highly specialized for the mastication of animal food and more adapted for grinding miscellaneous soft food, such as fruit, roots, nuts, honey, insects, etc. Most of the bears are expert at climbing, though the adult grizzly bear is said to have lost



Brown Bear (*Ursus arctos*).

this power. The bear family is of wide distribution geographically, its range embracing the high and low latitudes of the two hemispheres. In the Arctic region the white or polar bear (*Ursus maritimus*) is found. It is yellowish-white in color and long in body and neck, also the length of head, its cranial development differing considerably in this respect from other species. It is fierce in disposition, an adept swimmer, getting its food principally from the sea, and is altogether carnivorous. The great brown bear (*Ursus arctos*) inhabits northern Europe and Asia, its range extending from Siberia

Bear

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to Syria, where the Atlas Mountain bear, its smallest variety, is found. A variety of the species, also a very large bear, is the cinnamon bear of the northern United States and Canada. The grizzly bear (*Ursus horribilis*) is a distinctly North American species, being a denizen chiefly of the mountainous region of the western



Polar Bear (*Ursus maritimus*).

United States and portions of Canada. The well-known American black bear (*Ursus Americanus*) is distributed over nearly all the wooded region of the Continent. In the St. Elias Alps of Alaska a small and rare gray-coated species exists, called the glacier bear (*Ursus middendorffi*). South America has a single species, the small, spectacled bear, inhabiting the higher Andes; by some naturalists classed as a distinct genus, *Tremarctos ornatus*. The Asian black bears (*Ursus tibetanus*) are found in the Himalayan region, northern China and Japan. They resemble the American black bear, but have a crescent-shaped white or yellowish mark on the breast. Another little known parti-colored species (*Ursus prinosus*) inhabits Tibet. In the Malay archipelago is found the little sun bear. The distinct sloth or honey bear (*Melursus labiatus*) is a native of India, living mostly in the jungle and subsisting chiefly on insects. All of the northern bears hibernate during the winter. It is at this time that the cubs, usually two, are born.

Bear, GREAT and LITTLE, the popular name of two constellations in the northern hemisphere. The Great Bear (*Ursa Major*) is situated near the pole. It is remarkable for its well-known seven stars, by two of which, called the Pointers, the pole-star is always readily found. These seven stars are popularly called the *Wagon*, *Charles's Wain*, or the *Plow*. The Little Bear (*Ursa Minor*) is the constellation which contains the pole-star. This constellation has seven stars placed together in a manner resembling those in the Great Bear.

Bearberry (*Arctostaphylos uva-ursi*), an evergreen shrub of the heath family growing on the barren moors of Scotland, Northern Europe, Siberia, and N. America. The leaves, under the name of *uva-ursi*, are used in medicine as an astringent and tonic.

Beard (bêrd), the hair round the chin, on the cheeks, and the upper lip which is a distinction of the male sex and of manhood. It differs from the hair on the head by its greater hardness and its form. Some nations have hardly any, others a great profusion. The latter generally consider it as a great ornament; the former pluck it out; as, for instance, the American Indians. The beard has often been considered as a mark of the sage and the priest. Moses forbade the Jews to shave their beards. With the ancient Germans the cutting off of another's beard was a high offense. Even now the beard is regarded as a mark of great dignity among many nations in the East, as the Turks. Alexander the Great introduced shaving among the Greeks, by ordering his soldiers to wear no beards; among the Romans it was introduced in B.C. 296. The custom of shaving is said to have come into use in modern times during the reigns of Louis XIII and XIV of France, both of whom ascended the throne without a beard. Till then fashion had given divers forms of mustaches and beards. It was only in comparatively recent times that beards and mustaches again became common. This name is also given to the awns or aristæ of certain cereals, such as wheat, rye, etc., bristle-like projections from the bract in the inflorescence, produced by a prolongation of the midrib.

Beard-grass, a name given to two grasses of the genus *Polypogon* from the bearded appearance of the panicles.

Beard-moss (*Usnea barbata*), a lichen of gray color, forming a shaggy coat on many forest trees.

Beardstown, a city of Cass Co., Illinois, 112 miles N. of St. Louis. It is on Illinois River and has large fishing and ice-packing industries; also various manufactures. Pop. 6107.

Bearing (bâ'ring), the direction or point of the compass in which an object is seen, or the situation of one object in regard to another, with reference to the points of the compass. Thus, if from a certain situation an object is seen in the direction of northeast, the bearing of the object is said to be N. E. from the situation.—To take bear-

lags, to ascertain on what point of the compass objects lie.

Bear Lake, GREAT, an extensive sheet of fresh water in the Northwest Territory of Canada, between about 65° and 67° 32' N. lat.; and under the 120th degree of W. long.; of irregular shape; area about 7000 sq. miles. The water is very clear and the lake abounds in fish.—**BEAR-LAKE RIVER**, the outlet at the S. W. extremity of Great Bear Lake, runs S. W. for 70 miles and joins the Mackenzie River.

Béarn (bâ-arn), one of the provinces into which France was formerly divided, now chiefly included in the department of Lower Pyrenees. Pau is the chief town. There is a peculiar and well-marked dialect—the Béarnese—spoken in this district, which has much more affinity with the Spanish than with the French.

Bear-pit, a deep, open pit with perpendicular walls, built in a zoological garden for keeping bears, and having in the center a pole in which they may exercise their climbing powers.

Bear River, a river of the United States, 400 miles long; rises in the north of Utah, and flows northward into Idaho; turns abruptly southward, re-enters Utah, and empties into Great Salt Lake.

Bear's Grease, the fat of bears, esteemed as of great efficacy in nourishing and promoting the growth of hair. The unguents sold under this name, however, are in a great measure made of hog's lard or veal fat, or a mixture of both, scented and slightly colored.

Beas (bē'as), a river of India. See *Bias*.

Beat (bēt), in music, the beating or pulsation resulting from the joint vibrations of two sounds of the same strength, and all but in unison. Also a short shake or transient grace-note struck immediately before the note it is intended to ornament.

Beatification (bē-at-i-fi-kā'shun), in the Roman Catholic Church, an act by which the pope declares a person beatified or blessed after his death. It is the usual preliminary to canonization, that is, the raising one to the honor and dignity of a saint. Canonization, however, does not necessarily follow. All certificates or attestations of virtues and miracles, the necessary qualifications for saintship, are examined by the Congregation of Rites. This examination often continues for several years; after which his holiness decrees the beatification, and the image and relics of

the future saint are exposed to the veneration of all good Christians.

Beating the Bounds, the periodical survey or perambulation by which the boundaries of parishes in England are preserved. It is, or was, the custom that the clergyman of the parish, with the parochial officers and the boys of the parish school, should march to the boundaries, which the boys struck with willow rods. A similar ceremony in Scotland is called *riding the marches*.

Beaton (bē'ton), DAVID, Archbishop of St. Andrews, and cardinal, born 1494. Pope Paul III raised him to the rank of cardinal in December, 1533. On the death of his uncle, Archbishop James Beaton, he succeeded him in the see of St. Andrews in 1539. After the accession of Mary he became Chancellor of Scotland, and distinguished himself by his zeal in persecuting members of the Reformed party, among the rest the famous Protestant preacher George Wishart, whose sufferings at the stake viewed from his window with apparent exultation. At length a conspiracy was formed against him, and he was assassinated at his own castle of St. Andrews on the 29th May, 1546. His private character was fiercely attacked by his enemies.

Beatrice (bē'a-trēs), a city of Garfield county, Nebraska, 43 miles south of Lincoln. It is a railroad center and has important brick, flour, iron and other works. Pop. 7875.

Beatrice Portinari (bē-a-trē'chee por-tē-nā'ri), the poetical idol of Dante; born about 1266; died in 1290; the daughter of a wealthy citizen of Florence, and wife of Simone de' Bardi. She was but eighteen years of age, and Dante nine, when he met her first at the house of her father. He altogether saw her only once or twice, and she probably knew little of him. The story of his love is recounted in *Vita Nuova*, which was mostly written after her death.

Beattie (bē'ti), JAMES, a Scottish poet and miscellaneous writer, born at Laurencekirk, Kincardineshire, 1735; died, 1803. In 1760 he published a volume of poems, which he subsequently endeavored to buy up, considering them unworthy of him. In 1765 he published a poem, the *Judgment of Paris*, and in 1768 his celebrated *Essay on Truth*, for which the University of Oxford conferred on him the degree of LL.D.; and George III honored him, when on a visit to London, with a private conference and a pension. He next published in 1771 the first book of his poem the *Minstrel*, and in 1774 the second; this is the only work by which

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Beatty (bē'tī), SIR DAVID, a British admiral, son of Captain D. L. Beatty, of Borodale, Wexford, Ireland, born in 1871. He commanded the First Battle Squadron in the European war, and for his valiant service in the Jutland battle (q. v.) was made a Knight Commander of the Royal Victorian Order; G.C.B. in 1916; G.C.V.O. in 1917. He was commander of the Grand Fleet from 1916. He entered the navy in 1884; Commander in 1898; Rear-Admiral, 1910; Vice-Admiral, 1915.

Beatty, John, physician; born in 1749; Bucks County, Pa., Dec. 19, 1749; was graduated at Princeton in 1769; studied medicine; became a colonel in the Pennsylvania line; and in 1778-80 he was commissary-general of prisoners. He was a delegate in the Congress of the Confederation, 1783-85, and of the national Congress, 1793-95. He was Secretary of State for New Jersey for ten years—1795-1805. He died at Trenton, N. J., April 30, 1826.

Beaucaire (bō-kār), a small, well-built, commercial city of southern France, dep. Gard, on the Rhone opposite Tarascon, with which it communicates by a fine suspension-bridge. It is chiefly famous for its great fair (founded in 1217), held yearly during the middle of July. Pop. 7284.

Beauchamp (bō-shāp), ALPHONSE DE, a French historian and publicist, born at Monaco in 1767; died at Paris in 1832. Under the Directory he had the surveillance of the press, a position which supplied him with materials for his *History of La Vendée*. He contributed to the *Moniteur* and the *Gazette de France*. Among his chief works are the *History of the Conquest of Peru*, the *History of Brazil*, and the *Life of Louis XVIII*. The *Mémoires of Fouché* is also with good reason ascribed to him.

Beaufort (bō'fort), HENRY, cardinal, natural son of John of Gaunt and half-brother of Henry IV, king of England, born 1377, died 1447; was made Bishop of Lincoln, whence he was transferred to Winchester. He repeatedly filled the office of lord-chancellor, and took part in all the most important political movements of his times.

Beaugency (bō-zhāp-sē), an ancient town, France, dep. Loi-

ret, on the Loire, of some historical interest. General Chanzy was defeated here by the Grand-duke of Mecklenburg. 7th-8th December, 1870. Pop. 2003.

Beauharnais (bō-ar-nā), ALEXANDRE, VISCOUNT, was born in 1760 in Martinique. He married Joséphine Tascher de la Pagerie, who was afterwards the wife of Napoleon. At the breaking out of the French revolution he was chosen a member of the National Assembly, of which he was for some time president. In 1792 he was general of the army of the Rhine. He was falsely accused of having promoted the surrender of Mainz, and was sentenced to the guillotine, July 23, 1794.

Beauharnais, EUGÈNE DE, Duke of Leuchtenberg, Prince of Eichstätt, and Viceroy of Italy, during the reign of Napoleon, was born in 1781; died at Munich in 1824. He was the son of Alexandre Beauharnais and Joséphine, afterwards wife of Napoleon and Empress of France. After his father's death he joined Hoche in La Vendée and subsequently studied for a time in Paris. He accompanied Napoleon to Egypt in 1798; rose rapidly in the army; was appointed viceroy of Italy in 1805; and married a daughter of the King of Bavaria in 1806. He administered the government of Italy with great prudence and moderation, and was much beloved by his subjects. In the Russian campaign he commanded the third *corps d'armée*, and greatly distinguished himself. To him and to Ney France was mainly indebted for the preservation of the remains of her army during the retreat from Moscow. After the battle of Lützen of May 2, 1813, where, by surrounding the right wing of the enemy, he decided the fate of the day, he went to Italy, which he defended against the Austrians until the deposition of Napoleon. After the fall of Napoleon he concluded an armistice, by which he delivered Lombardy and all Upper Italy to the Austrians. He then went immediately to Paris, and thence to his father-in-law at Munich, where he afterwards resided.—His sister HORTENSE EUGÉNIE, Queen of Holland, was born in 1783, died in 1837. She became Queen of Holland by marrying Louis Bonaparte, and after Louis's abdication of the throne she lived apart from him. She wrote several excellent songs, and composed some deservedly popular airs, among others the well-known *Partant pour la Syrie*. Napoleon III was her third and youngest son.

Beaumarchais (bō-mār-shā), PIERRE AUGUSTIN CARON DE, a French wit and dramatist, was born

at Paris in 1732; died in 1799. He was the son of a watchmaker named Caron, whose trade he practised for a time. He early gave striking proofs of his mechanical and also of his musical talents; attained proficiency as a player on the guitar and harp, and was appointed harp-master to the sisters of Louis XV. By a rich marriage (after which he added 'de Beaumarchais' to his name) he laid the foundation of the immense wealth which he afterwards accumulated by his speculations, and which was also increased by a second marriage. In the meantime he occupied himself with literature, and published two dramas—*Eugénie* in 1767 and *Les Deux Amis* in 1770. He first really distinguished himself by his *Mémoires* (Paris, 1774), or statements in connection with a lawsuit, which by their wit, satire, and liveliness entertained all France. *The Barber of Seville* (1775) and the *Marriage of Figaro* (1784) have given him a permanent reputation. His last work was *Mes Six Époques*, in which he relates the dangers to which he was exposed in the revolution. At the opening of the American Revolution he made, as the secret agent of the French government, a contract to supply the colonies with arms and ammunition. He lost about a million livres by his edition of the works of Voltaire (1785), and still more at the end of 1792 by his attempt to provide the French army with 60,000 muskets. He was a singular instance of versatility of talent, being at once an artist, politician, financier, and dramatist.

Beaumaris (bō-ma'ris), a seaport town, North Wales, Isle of Anglesey, on the Menai Strait. It is a favorite watering-place, and contains the remains of a castle built by Edward I about 1295. Pop. 2233.

Beaumont (bō'mont), FRANCIS, and FLETCHER, JOHN, two eminent English dramatic writers, contemporaries of Shakespeare, and the most famous of literary partners. The former, son of a common pleas judge, was born at Grace-Dieu, in Leicestershire, in 1584; died in 1616, and was buried in Westminster Abbey. At the age of sixteen he published a translation, in verse, of Ovid's fable of *Salmacis and Hermaphroditus*, and before nineteen became the friend of Ben Jonson. With Fletcher also he was early on terms of friendship. He married Ursula, daughter of Henry Isley of Sundridge, in Kent, by whom he left two daughters.—JOHN FLETCHER was born at Rye, Sussex, in 1579. His father was successively dean of Peterborough, bishop of Bristol, Worcester, and London. The

Woman Hater, produced in 1606-7, is the earliest work known to exist in which he had a hand. It does not appear that he was ever married. He died in London of the plague, August, 1625, and was buried at St. Saviour's, Southwark. The friendship of Beaumont and Fletcher, like their literary partnership, was singularly close; they lived in the same house, and are said to have even had their clothes in common. The works that pass under their names consist of over fifty plays, a masque, and some minor poems. It is believed that all the minor poems except one were written by Beaumont. After the death of Beaumont, Fletcher continued to write plays alone or with other dramatists. It is now difficult, if not indeed impossible, to determine with certainty the respective shares of the two poets in the plays passing under their names. According to the testimony of some of their contemporaries Beaumont possessed the deeper and more thoughtful genius, Fletcher the gayer and more idyllic. Among their dramas are *The Maid's Tragedy*, *Philaster*, *Cupid's Revenge*, etc. *The Masque of the Inner Temple* was written by Beaumont alone. *The Faithful Shepherdess* and others by Fletcher alone.

Beaumont, a city, capital of Jefferson Co., Texas, 84 miles E. by N. of Houston; has shingle, saw, and rice mills, oil refineries and iron and steel plants, etc. The lumber industry is important, and there are large oil wells and iron ore in the vicinity. The government provision of a 26-foot ship channel makes the city an important inland port. Pop. 20,640.

Beaumont, SIR GEORGE, born of an ancient family in Leicestershire in 1753, died in 1827. He was a landscape-painter, but was noted more as a patron of the arts interested in the establishment of the National Gallery.

Beaumont, SIR JOHN, born in 1582; Francis Beaumont the dramatist; brother of published *Bosworth Field*, an historical poem. He also wrote a poem in eight books, never printed, called *The Crown of Thorns*.

Beaumont (bō-mon'), JEAN BAPTISTE ELIE DE (1798-1875), French geologist; taught geology in the Ecole des Mines and Collège de France, was elected to the Academy in 1835, and became in 1856 its perpetual secretary. With Dufrénoy he prepared a great geological map of France (1840; 2d Ed. 1855).

Beaumont, WILLIAM, an American surgeon, born in 1785;

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died in 1858. His experiments on diges- tion with the Canadian St. Martin, who lived for years after receiving a gunshot wound in the stomach which left an aperture of about two inches in diam- eter, were of great importance to physio- logical science.

Beaune (bôn), a town, France, dep. Côte d'Or, 23 miles s. s. w. of Dijon, well built, with handsome medi- eval church, a large library, museum, etc., and a trade in the fine Burgundy and other wines of the district. Pop. 11,668.

Beaune (bôn), FLORIMOND, a distin- guished mathematician and friend of Descartes, born at Blois in 1601; died at the same place in 1652. He may be regarded as the founder of the integral calculus.

Beauregard (bô-ré-gârd), PIERRE GUS- TAVE TOUTANT, a gen- eral of the Confederate troops in the American Civil war, born in 1818 near New Orleans. He studied at the military academy, West Point, and left it as artillery lieutenant in 1838. He served in the Mexican war, and on the outbreak of the Civil war joined the Confederates. He commanded at the bombardment of Fort Sumter, gained the battle of Bull Run, lost that of Shiloh, assisted in the defense of Charleston, and surrendered with Johnston's forces in April, 1865. He died Feb. 20, 1893.

Beausobre (bô-sô-br), ISAAC, born in 1659 at Nîort, in France; died at Berlin in 1738. In 1683 he be- came Protestant minister of Chatillon-sur- Indre, but was compelled by persecution to go into exile in 1685. In 1694 he be- came minister to French Protestants at Berlin. He enjoyed much of the favor both of Frederick William I and of the crown prince, afterwards Frederick the Great. His most important work is the *Histoire Critique de Manichéisme et du Manichéisme* (1734).

Beauty, THE BEAUTIFUL. See ÆS- THETICS.

Beauvais (bô-vâ; ancient *Bellova- cum*), a town of France, capital of the department of Oise, at the confluence of the Avelon with the Thérain, 43 miles north of Paris, poorly built, but with some fine edifices, the choir of the uncompleted cathed- ral being one of the finest speci- mens of Gothic architecture in France. Beauvais is a very old town, dating back to the Roman period. In 1472 it resisted a large army of Burgundians under Charles the Bold. On this occasion the women particularly distinguished them- selves, and one of them, Jeanne l'ainé, called *La Hachette*, seeing a soldier plant-

ing a standard on the wall, seized it and buried him to the ground. The banner is said to be preserved, and an annual pro- cession of young girls commemorates the deed. Manufactures: tapestry and car- pets, trimmings, woollen cloth, cottons, etc. Pop. 17,045.

Beaux (bô), CECILIA, an American painter (1863-), born at Philadelphia. She was awarded the Mary Smith prize, given by the Pa. Academy of Fine Arts, four times. She won the Dodge prize of the National Academy of Design and many other honors.

Beaver (bê-vér), a rodent quadruped, about 2 feet in length exclu- sive of the tail, genus *Castor* (*O. fiber*), at one time common in northern Europe



Beaver (*Castor Canadensis*)

and Asia. An allied species (*O. Cana- densis*) is found in considerable numbers only in North America, living in colonies; *O. fiber*, occurring solitary in Central Europe and Asia. It has short ears, a blunt nose, small forefeet, large webbed hind feet, with a flat ovate tail covered with scales on its upper surface. It is valued for its fur, which used to be largely em- ployed in the manufacture of hats, but for



Types of Beaver

which silk is now for the most part sub- stituted, and for an odoriferous secretion named castor, at one time in high repute, and still largely used in some parts of the

world as an anti-spasmodic medicine. The food of the beaver consists of the bark of trees, leaves, roots, and berries. Their favorite haunts are rivers and lakes which are bordered by forests. In winter they live in houses, which are 3 to 4 feet high, built by them on the water's edge, and being substantial structures with the entrance under water, afford the inmates protection from wolves and other animals. These 'lodges' usually hold four old and six to eight young beavers. Beavers can gnaw through large trees with their strong teeth. When they find a stream not sufficiently deep for their purpose, with great ingenuity they throw across it a dam constructed of wood, stones, and mud.

Beaverdam, a city of Dodge Co., Wisconsin, at the S. E. end of Beaver Lake, 63 miles N. W. of Milwaukee. It is a summer resort and has iron industries, stove works, hosiery mills, and other industries. Pop. 6768.

Beaver Falls, a borough of Pennsylvania, near the junction of the Beaver River with the Ohio, 34 miles from Pittsburgh. Its industries include file, wire, tube-glass and various other works. There are coal mines, quarries, and natural gas wells in its vicinity. Pop. 12,191.

Beaver-rat (*Hydromys chrysogaster*), a Tasmanian rodent quadruped, inhabiting the banks both of salt and fresh waters.

Bebeeru (be-bē'ru; *Ocotea Rodiaei*), a tree of British Guiana, yielding greenheart timber.

Bebel (bā'bel), FERDINAND AUGUST, German socialist, born at Cologne, February 22, 1840; died August 12, 1913. A turner by trade, he took part in the labor movement and eventually adopted socialistic principles. Elected to the German Diet in 1867 and to the Imperial Reichstag in 1871, he was accused of high treason and condemned to imprisonment. He subsequently became the leader of the Social Democrats.

Bec (bek), a celebrated abbey of France, in Normandy, near Brionne, now represented only by some ruins.

Beccafico (bek-a-fī'kō), a European bird (*Sylvia hortensis*), the garden-warbler.

Beccafumi (bek-a-fū'mē), DOMENICO, an Italian painter, born near Siena in the latter half of the fifteenth century, enriched the churches of Siena with many noble frescoes and other paintings. He drew and colored well, and possessed strong inventive powers. He died at Siena 1551, and was buried in its cathedral.

Beccaria (bek-ā-rē'ā), CESARE BONSANA, MARCHESE DI, Italian

economist and writer on penal laws, born in 1738 or 1739; died in 1794. He is principally known from his treatise, *On Crimes and Punishments*, which was speedily translated into various languages, and to which many of the forms in the penal codes of the principal European nations are traceable. He became professor of political economy at Milan, where he died.

Beccaria (bek-ā-rē'ā), GIOVANNI BATISTA, an Italian natural philosopher, born 1716; died 1781; was appointed professor of experimental physics at Turin, 1748; author of a treatise on *Natural and Artificial Electricity, Lectures on Electricity*, etc. He contributed several articles to the *Transactions* of the Royal Society of London, and was commissioned in 1759 to measure an arc of the meridian in the neighborhood of Turin.

Beccles (bek'ls), a town of England in Suffolk, 83 miles N. N. W. from Ipswich, on the right bank of the Waveney; has a fine church of the fourteenth century, and a good trade coastwise. Pop. 7139.

Beccerra (be-ther'ā), GASPAR, a Spanish painter and sculptor, born 1520; died 1570. He studied under Michael Angelo at Rome, and is credited with the chief share in the establishment of the fine arts in Spain.

Beche (bāsh), SIR HENRY DE LA, an English geologist, born 1796; died 1855. He founded the geological survey of Great Britain, which was soon undertaken by the government, De La Beche being appointed director-general. He also founded the Jermyn Street Museum of Economic or Practical Geology, and the School of Mines. His principal works are: *Geology of Jamaica*, *Classification of European Rocks*, *Geological Manual*, *Researches in Theoretical Geology*, *Geology of Cornwall, Devon, and West Somerset*, etc.

Beche-de-Mer (bāsh-dē-mār). See *Trepang*.

Becher (be'cher), JOHANN JOACHIM, a German chemist, born in 1635; died in London in 1682. He became a professor at Mainz; was elected member of the imperial council at Vienna 1666, but fell into disgrace and subsequently resided in various parts of Germany, Holland, Italy, Sweden, and Great Britain. His chief work, *Physico Subterranea*, containing many of the fanciful theories of the alchemists, was published in 1669, and enlarged in 1681.

Bechstein (be'h'stīn), JOHANN MATTHIAS, a German naturalist, born in 1757; died in 1822. He wrote

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a popular natural history of Germany, and various works on forestry, in which subject his labors were highly valuable. In Britain he is best known by a treatise on cage birds.

Bechuanas, BECHWANAS (bech-wan'-as), a widely spread race of people inhabiting the central region of South Africa north of Cape Colony. They belong to the great Bantu family, and are divided into tribal sections. They live chiefly by husbandry and cattle rearing, and they work with some skill in iron, copper, ivory, and skins. They have been much harassed by Boers and others, and this led them to seek British protection. From 1878 to 1890 South Bechuanaland was partly administered by British officers; and in 1891 and 1895 great part of the rest of their territory was brought under British influence, the farthest northern portion of it, however, reaching to the Zambesi being only a protectorate. The area is 51,500 sq. m., and pop. 73,000. Capital, Maseru. Another important town is Mafeking, which was conspicuous in the Anglo-Boer war. Northward of the town colony lies the Bechuanaland Protectorate, with an area estimated at 225,000 sq. m.; population unknown. Bechuanaland lies between the Transvaal on the east and the German Protectorate on the west. It is, generally speaking, flat or only slightly undulating, and is essentially a grass country, all the grasses being of a substantial and nutritious quality which stands well against drought. Surface water is scarce, but there is an extraordinary underground supply which no doubt will be turned to profitable account. Some parts are wooded and well watered. Gold, coal, and copper have been found.

Becker (bek'er), GEORGE F., geologist, born at New York in 1847; graduated at Harvard; instructor in mining at University of California 1875-79; afterwards on the U. S. Geological Survey. In 1898 he was sent to examine the mineral resources of the Philippines. Wrote several works on the geology of the western mining region.

Becker, WILHELM ADOLF, a German archaeologist, born at Dresden in 1796; died at Meissen in 1846. In 1828 he became a teacher at Meissen, in 1837 was appointed extraordinary professor of classical archaeology at Leipzig, and in 1842 ordinary professor. Best known works: *Gallus, oder römische Scenen aus der Zeit Augusts*, and *Charikles, oder Bilder altgriechischer Sitte*, which reproduce in a wonderful manner the social life of old Rome and Greece; also a *Manual of Roman Antiquities*.

Becket (bek'et), THOMAS (the form A Becket is also common), Archbishop of Canterbury, born in London 1117 or 1119; assassinated in Canterbury Cathedral 29th Dec., 1170. He was educated at London and Paris, and was sent, by the favor of Theobald, Archbishop of Canterbury, to study civil law at Bologna in Italy, and on his return made Archdeacon of Canterbury. In 1155 Henry II appointed him high-chancellor, and in this capacity he was vested with great powers. He became Henry's bosom friend and was consulted in all affairs of state. At this period he was a complete courtier, conforming in every respect to the humor of the king. He was, in fact, the king's prime companion, held splendid levees, and courted popular applause. On the death of Theobald, 1162, he was consecrated Archbishop, when he displayed an extraordinary austerity of character, and appeared as a zealous champion of the church against the aggressions of the king, whose policy was to have the clergy in subordination to the civil power. Becket was forced to assent to the 'Constitutions of Clarendon,' but a series of bitter conflicts with the king followed, ending in Becket's flight to France, when he appealed to the pope, by whom he was supported. After much negotiation a sort of reconciliation took place in 1170, and Becket returned to England, resumed his office, and renewed his defiance of the royal authority. A rash hint from the king induced four barons, Reginald Fitz-Urse, William de Tracy, Hugh de Morville, and Richard Breto, to go to Canterbury and murder the archbishop while at vespers in the cathedral. By no one was the deed regretted more than by Henry, and the whole nation was shocked. Becket was canonized in 1172, and the splendid shrine erected at Canterbury for the remains was, for three centuries, a favorite place of pilgrimage.

Beckett, GILBERT ABBOTT A. See A Beckett.

Beckford (bek'ford), WILLIAM, an English writer famous in his time for his immense wealth and his eccentricities. He was born at Fonthill, his father's estate in Wiltshire, in 1739. In 1770 the death of his father left him in the possession of \$5,000,000 of money, and an income of \$500,000 a year. He traveled much, and for some time lived in Portugal. He expended an enormous sum in building and rebuilding Fonthill Abbey, near Salisbury, which he filled with rare and expensive works of art. Here he lived in seclusion for twenty years. In 1822 the abbey and greater part of its contents were sold, and he retired to Bath, where, with a muca-

diminished fortune, but one amply sufficient, he lived till 1844. His literary fame rests upon his eastern tale *Vathek*, which he wrote in French, and a translation of which into English (said to be by a clergyman) appeared at London without his knowledge in 1784. The tale is still much read, and was highly commended by Lord Byron. He had two daughters, one of whom became Duchess of Hamilton, and brought his valuable library to this family.—**WILLIAM BECKFORD**, his father, a London merchant and West Indian proprietor, was famous for a spirited speech made to George III when Lord Mayor of London.

Beckmann (bek'man), **JOHANN**, German writer on the industrial arts and agriculture, born in 1739, died 1811. He was for a short time professor of physics and natural history at St. Petersburg, and afterwards for almost forty-five years professor of philosophy and economy in Göttingen. His *History of Inventions* is well known in its English translation.

Beckwith (bek'with), **JAMES CARROLL**, born 1852. A native of Hannibal, Mo., studied art at New York and Paris. He became prominent on his return in 1878, was president of the National Free Art League, and agitated for the repeal of customs duties on works of art. He has painted many famous men, including Mark Twain and General Schofield.

Beckwith, **SIR GEORGE**, English military officer, born 1753; died 1823. He fought against the Colonists in the Revolutionary war. In the West Indies he was active against the French, taking Martinique and Guadeloupe (1810).

Beckx (beks), **PIERRE JEAN**, general of the order of Jesuits, born near Louvain, Belgium, 1795; died 1887. The success of the Jesuits, especially in non-Catholic countries, was greatly due to his tact and energy.

Bequerel (bek-rel), **ANTOINE CESAR**, a French physicist, born in 1788; died in 1878. He served as an officer of engineers, and retired in 1815, to devote himself to electro-chemistry.

Bequerel, **ANTOINE HENRI** (1852-1908), a French physician discoverer of the so-called Bequerel rays, similar to the X-rays or Roentgen rays (q. v.), which can pass through objects opaque to visible radiation.

Becse (bech'e), **OLD**, a town of Hungary, 43 miles s. of Szegedin, on the right bank of the Theiss. Pop. 12,865.

Becskerek (bech'ke-rek), a town of South Hungary, on the

Bega, 45 miles s. w. from Temesvar, with which it communicates by the Bega Canal. Trade in cattle and agricultural produce. Pop. 26,400.

Bed, **BEDSTEAD**, an article of furniture to sleep or rest on. The term *bed* properly is applied to a large flat bag filled with feathers, down, wool, or other soft material, and also to a mattress supported on spiral springs or form of elastic chains or wire-work which is raised from the ground on a bedstead. The term, however, sometimes includes the bedstead or frame for supporting the bed. The forms of beds are necessarily very various—every period and country having its own form of bed. Air-beds and water-beds (which see) are much used by invalids.

Bed, in geology, a layer or stratum, usually a stratum of considerable thickness.

Beda. See *Bede*.

Bedarieux (bâ-dâr-i-ew), a thriving manufacturing town in Southern France, dep. Hérault, situated on the Orb. Pop. (1906) 5594.

Bedbug. See *Bug*.

Bed-chamber, **LORDS OF THE**, officers of the royal household of Britain under the groom of the stole. They are twelve in number, and wait a week each in turn. In the case of a queen regnant these posts are occupied by ladies, called *Ladies of the Bed-chamber*.

Beddoes (bed'des), **THOMAS**, physician and author, born in 1760; educated at Oxford, London, and Edinburgh; appointed reader in chemistry at Oxford. There he published some excellent chemical and medical treatises. His expressed sympathy with the French revolutionists led to his retirement from his readership in 1792, soon after which he published his *Observations on the Nature of Demonstrative Evidence* and the exceedingly popular *History of Isaac Jenkins*. In 1794 he married a sister of Maria Edgeworth; and in 1798, aided by Richard Lovell Edgeworth, opened a pneumatic institution for curing phthisical and other diseases by inhalation of gases. It speedily became an ordinary hospital, but was noteworthy as connected with the discovery of the properties of nitrous oxide, and as having been superintended by the young Humphry Davy. Beddoes's essays on *Consumption*, on *Fever*, and his *Hygeia* had a high contemporary repute. He died in 1808.

Beddoes, **THOMAS LOVELL**, dramatist, born in 1803; published the *Bride's Tragedy* while an undergraduate

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at Oxford, and led an eccentric life, dying in 1849. His work was largely fragmentary, but his posthumous *Death's Jest-book, or the Fool's Tragedy* (1850), received the high praise of such judges as Landor and Browning. His *Poems*, with memoir, appeared in 1851.

Bede (bēd), also BEDA, or BÆDA, known as the Venerable, an Anglo-Saxon scholar, born in 672 or 673 in the neighborhood of Monkwearmouth, County Durham; educated at St. Peter's monastery, Wearmouth; took deacon's orders in his nineteenth year at St. Paul's monastery, Jarrow, and was ordained priest at thirty by John of Beverley, Bishop of Hexham. His life was spent in studious seclusion, the chief events in it being the production of homilies, hymns, lives of saints, commentaries, and works in history, chronology, grammar, etc. He was the most learned Englishman of his day, and in some sense the father of English history, his most important work being his *Historia Ecclesiastica Gentis Anglorum* (or 'Ecclesiastical History of England'), afterwards translated by King Alfred into Anglo-Saxon. Besides his familiarity with Latin, he knew Greek and had some acquaintance with Hebrew. Most of his writings were on scriptural and ecclesiastical subjects, but he also wrote on chronology, physical science, grammar, etc., and had considerable ability in the writing of Latin verse. He died in 735, an interesting record of his closing days being preserved in a letter by his pupil Cuthbert. His body was after a lapse of time removed from Jarrow church to Durham, but of the shrine which formerly enclosed them only the Latin inscription remains, ending with the verse—'Hac sunt in fossa Bedæ venerabilis ossa.'

Bedeguar, or BEDEGAR (bed'-e-gär), a spongy excrescence or gall, sometimes termed sweet-briar sponge,



a a, Bedeguar on the Rose.

found on various species of roses, and

produced by several insects as receptacles for their eggs, especially by the *Rhodites rose*, the larvae of which may be found feeding upon the juices of the plant. It was once thought to be a diuretic and vermifuge.

Bedell (be-del'), WILLIAM, a celebrated Irish bishop, born in Essex in 1571. In 1607 he went to Venice as chaplain to Sir Henry Wotton, and remained four years. After holding the living of Horningsheath from 1616-27 he became provost of Trinity College, Dublin, and in 1629 Bishop of Kilmore and Ardagh, though he resigned the latter of the united sees in 1633. He set himself to reform abuses and promote the spread of Protestantism, procured the translation of the Old Testament into Irish, and by his tact and wisdom conciliated the adherents of both creeds. He underwent a brief imprisonment on the breaking out of the rebellion in 1641, and died in the year following. His biography was written by Bishop Burnet.

Be'der Ware. See *Bidery*.

Bed'ford (bed'furd), a municipal borough of England, the county town of Bedfordshire, on the Ouse. The chief buildings are the law courts, a range of public schools, a large infirmary, county jail, etc., and the churches. The town is rich in charities and educational institutions, the most prominent being the Bedford Charity, embracing grammar and other schools, and richly endowed. There is an extensive manufactory of agricultural implements; lace is also made, and there is a good trade. John Bunyan was born at Elstow, a village near the town, and it was at Bedford that he lived, preached, and was imprisoned. Pop. 39,185.—BEDFORDSHIRE, or BEDS, the county, is bounded by Northampton, Bucks, Herts, Cambridge, and Huntingdon; area, 466.4 sq. miles, of which nearly nine-tenths is under tillage or in permanent pasture. Chalk hills, forming a portion of the Chilterns, cross it on the S.; N. of this is a belt of sand; the soil of the vale of Bedford, consisting mainly of clay and loam, is very fertile; and the meadows on the Ouse, Ivel, and other streams furnish rich pasturage. Besides the usual cereal and other crops, culinary vegetables are extensively cultivated for the London market. Principal manufactures: agricultural implements, and straw-plait for hats, which is made up principally at Dunstable and Luton. Pop. (1911) 195,814.

Bedford, JOHN, DUKE OF, one of the younger sons of Henry IV, King of England; famous as a statesman

and a warrior. He defeated the French fleet in 1416, commanded an expedition to Scotland in 1417, and was lieutenant of England during the absence of Henry V in France. On the king's death he became regent of France, and for several years his policy was as successful as it was able and vigorous, the victory of Verneuil in 1424 attesting his generalship. The greatest stain on his memory is his execution of the Maid of Orleans (Joan of Arc) in 1431. He died in 1435 at Rouen.

Bedford, a city, capital of Lawrence Co., Indiana, 71 miles N. W. of New Albany. It has electric power and good railroad facilities, and is within 40 miles of Indiana's great coal field. Pop. (1910) 8716.

Bedlam, a corruption of Bethlehem (Hospital), the name of a religious house in London, converted, after the general suppression by Henry VIII, into a hospital for lunatics. The original Bedlam stood in Bishopsgate Street, its modern successor is in St. George's Fields. The lunatics were at one time treated as little better than wild beasts, and hence Bedlam came to be typical of any scene of wild confusion.

Bedmar (bed-mar'), ALPHONSO DE LA CUEVA MARQUIS DE, a Spanish cardinal, born in 1572; was sent in 1607 by Philip III as ambassador to Venice, and became famous through an alleged conspiracy with the Milanese and Neapolitan governors to overthrow the republic of Venice and subject it to Spanish domination (1618). On its discovery Bedmar escaped, and was appointed governor of the Low Countries by the king and cardinal by the pope. Died in 1655. The plot is the subject of Otway's *Venice Preserved*.

Bed of Justice. See *Lit. de Justice*.

Bedouins (bed-ū-zūz'; Arabic *Bedawi*, pl. *Bedawin*, 'dwellers of the desert'), a Mohammedan people of Arab race inhabiting chiefly the deserts of Arabia, Syria, Egypt, and North Africa. They lead a nomadic existence in tents, huts, caverns and ruins, associating in tribes under sheiks, to whom all disputes are referred. In respect of occupation they are only shepherds, herdsmen, and horse-breeders, varying the monotony of pastoral life by raiding on each other and plundering unprotected travelers, whom they consider trespassers. They are ignorant of writing and books, their knowledge being purely traditional and mainly genealogical. They are lax in morals, and unreliable even in respect of the code of honor attributed to them in

poetry and fiction. In stature they are undersized, and though active, they are not strong. The ordinary dress of the men is a long shirt girt at the loins, a black or red and yellow handkerchief for the head, and sandals; of the women loose drawers, a long shirt, and a large dark-blue shawl covering the head and figure. The lance is the favorite weapon.

Bed-sores, a troublesome kind of sores, liable to appear on patients long confined to bed, and either unable or not allowed to change their position, and occurring at the parts chiefly pressed by the weight of the body.

Bedstead. See *Bed*.

Bed'straw, the popular name of the *Gallium*, different species of *Gallium*, a genus of plants, order Rubiaceae. The Yellow Bedstraw or Cheese-rennet (*G. verum*), the flowers and roots of which afford yellow and red dyes, is rare in New England. Goosegrass (*G. sparganium*) is a well-known member of the genus, the juice of which has been used in *lepra* and other cutaneous diseases.

Bee, a large and natural family of the zoological order *Hymenoptera* characterized by the plumose form of many of their hairs, by the large size of the basal segment of the foot and by the development of a 'tongue' for sucking liquid food. Bees are specialized in correspondence with the flowers from which they draw the bulk of their food supply, the flexible tongue being used for sucking nectar, the plumed hairs and modified legs for gathering pollen. These floral products are in most cases collected and stored by the bees, but some genera, 'cuckoo-parasites,' lay their eggs in the nests of other bees. In many genera of bees there are ordinary males and females, the females constructing a nest formed of several cells, and placing in each of them a supply of food for the grub which is to hatch from the eggs laid therein. Such bees, although a number of them frequently make nests together, are termed 'solitary,' to distinguish them from the 'social' bees, among which there are two kinds of females—the normal fertile females or 'queens' and the modified females with undeveloped ovaries that are called 'workers.' Among the bumble-bees (*Bombus*) the workers help the queen, who takes her share in the work of the family; but among the hive bees (*Apis*) the queen devotes her whole energy to the laying of eggs, while the workers perform all other duties of the hive. Solitary bees of different genera follow varying modes of nest-building. Many, like the *Halictus* and *Andrena*, burrow in the ground; others, like the *Osmia*, choose the hollow stem of a shrub.

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The leaf-cutter bees (*Megachile*) cut circular disks from leaves, which they use to line the cells of their underground nests; the carpenter bees (*Zylocopa* and others) make their nests in dry wood. The mason bees (*Ohalocodoma*), described in detail by Fabre, have the most remarkable nesting habits of all solitary bees. The female builds on a stone a series of cement cells, creating the cement from small particles of earth and stone, mixed with her own saliva. Eight or nine cells are constructed, each containing an egg and a store of honey and pollen; the whole is covered with a dome of cement.

Among the social bees the nest consists of cells formed of wax secreted by special glands in the abdomen of the bee, the wax being pressed out in the form of plates, and worked by the legs and jaws into the required shape. These wax glands in the *Apis* and *Bombus* are ventral in position, but in the 'stingless' bees of the tropics (*Trigona* and *Melipona*) they are dorsal. The colony of humble-bees is started in the spring by a female queen who has survived the winter, and who constructs her nest underground, forming a number of waxen cells. The young females assist the queen by building new cells and gathering food, and as the season advances the queen may be relieved of all work in the nest. In the autumn males are produced as well as young queens; but the winter kills both males and workers and only the young queens are left to hibernate. The workers sometimes, in case of the death of the queen, keep the community from dying out.

The *Apis*, the genus of the hive-bee, is the most highly specialized member of the bee family, queens and workers, as we have seen, being entirely differentiated, though the workers may be capable of laying unfertilized eggs from which males ('drones') are always hatched. The cells of the honeycomb are usually hexagonal in form; some are used for storage and others for the rearing of young. Those for the rearing of workers are smaller than those for the rearing of drones, while those for the rearing of young queens are larger than either, and roughly oval in shape. Fertilized eggs are laid in the queen and worker cells; unfertilized in the drone cells. Whether the fertilized egg shall develop into a queen or a worker is determined by the food. All young grubs are fed upon a 'royal jelly,' discharged from the worker's stomach and mixed with saliva. After the fourth day, unless the grub is to become a queen—and the workers determine this by the desirability or undesirability of relieving their own population by a swarm—a mixture of honey and digested pollen is substituted. Before the young queen

emerges, the old queen, prevented by the workers from attacking her royal daughters, leads off a swarm to find a new home. The young queen, after mounting high in the air for her nuptial flight, returns to the hive and begins her duties of egg-laying. At the approach of winter the drones are excluded from the hives and allowed to perish.

Apiculture has been engaged in from very early times, but it is only within recent years that it has been reduced to a science. Remarkable progress has been made in the art of queen-rearing and in improving the native bee by judicious crossing with foreign breeds; and the bee industry is now one of importance, especially in America. Many of the large bee farmers of the United States and Canada harvest from 50,000 to 60,000 pounds of honey in a single season. In the United States apiculture is officially recognized by the respective states' governments and by the federal government, and the Department of Agriculture which conducts valuable experimental work, has issued a bulletin for the aid of beekeepers. In several Canadian provinces, also, public funds are used for promoting the bee industry, and especially for combating the bee disease known as 'foul brood.' In many European countries technical schools, with well-equipped apiaries attached, are supported by the government for the sake of extending the science and practice of bee-keeping. The value of the bee to the fruit-grower and market-gardener has been proved beyond dispute, since the bee plays an important part, as fertilizer, in the economy of nature. As the science of apiculture has advanced the dome-shaped straw skep of the past has given place to the movable-frame hive. The typical hive of America is the improved Longstroth of ten frames, which is manipulated from above, so that any single frame may be raised for inspection without disturbing the others. Other causes (besides the invention of the movable frame) contributing to the development of the modern hive are the improvements in the method of extracting honey from combs and in the manufacture of comb foundation. The extractor, throwing the liquid honey out of the cells by centrifugal force, was first brought to public notice in 1865. It enabled the producer to increase his output and to extract the honey in most cleanly fashion without damaging the combs. Another machine for the manufacture of impressed wax sheets, or 'comb foundation' deserves mention. The advantage of this was at once realized by practical apiarists, both as a saving of labor to the bees and as economy to the bee-keeper.

The most serious disease with which the

apiarist has to contend is foul brood or bee-pest, so called because young broods die and rot in the cells. Since its bacterial origin has been discovered remedies have been found by which the disease may be checked or treated. Dysentery also often breaks out among bees after the long confinement of the winter; but this may be prevented by proper food and care.

Beech (*Fagus*), the common name of trees of the nat. order Cupuliferae, well known in various parts of the world, including New Zealand and Terra del Fuego. The *Fagus sylvatica*, a common European forest-tree, sometimes reaches a height of 120 feet, with a diameter of 4 or more, is known by its waved and somewhat oval leaves, its triangular fruit inclosed by pairs in a prickly husk, and by its smooth and silvery bark. The wood is hard and brittle, and if exposed to the air liable soon to decay. It is, however, peculiarly useful to cabinet-makers and turners, carpenters' planes, furniture, sabots, etc., being made of it; and it is durable under water for piles and mill-slucies. The fruit or *beechnut*, when dried and powdered, may be made into a wholesome bread; it has also occasionally been roasted and used as a substitute for coffee, and yields a sweet and palatable oil used by the lower classes of Silesia instead of butter. Beech-nut is, however, chiefly used as food for swine, poultry, and other animals. The leaves of the beech-tree collected in the autumn, before they have been injured by the frosts, are in some places used to stuff mattresses. The North American white beech is identical with the European species. Red-leaved varieties are common, the American *E. ferruginea* being of this color.

Beecher (*bē'cher*), HENRY WARD, an eminent American preacher, son of Lyman Beecher (a distinguished clergyman 1775-1863). He was born at Litchfield, Connecticut, June 24, 1813; was minister at Lawrenceburg, Indiana, in 1837, and of Plymouth Congregational Church, Brooklyn, New York, in 1847. The latter pulpit he continued to occupy till his death in 1887, though in 1882 he ceased his formal connection with the Congregationalists on the ground of disbelief in eternal punishment. From 1861 to 1863 he was editor of the *Independent*, and for about ten years after 1870, of the *Christian Union*. He was also the author of a considerable number of works, of which his *Lectures to Young Men* (1850), *Life Thoughts* (1858), *Lectures on Preaching* (1872-74), and the weekly issues of his sermons, commanded

wide circulation. Few contemporary preachers appealed to as large and diverse a public. He lectured to large audiences for many years throughout the United States. His brothers Charles, Edward and Thomas, all distinguished themselves as Congregational clergymen. His sister Catherine Esther (born 1800; died 1880) did much for the education of women, wrote on this subject and on domestic economy and kindred subjects. Mrs. Harriet Beecher Stowe, famous as a novelist, was another sister.

Beecher, LYMAN (1775-1863), an American theologian, born at New Haven, Conn., graduated from Yale College in 1797, and became pastor of the East Hampton (Long Island) Presbyterian Church in 1798. He was called to the Congregational Church of Litchfield, Conn., in 1810, remaining with that congregation till 1826. While serving these two churches he was becoming known as a pulpit orator and his published sermons were in great demand. He lectured against intemperance and drinking. He was for ten years pastor of the Second Presbyterian Church of Cincinnati from 1832, becoming coincidentally president of the Lane Theological Seminary. His last years were spent in Boston with his son, Henry Ward Beecher (q. v.).

Beecher Stowe, Harriet. See *Stowe*.

Beechey (*bē'chi*), ADMIRAL FREDERICK WILLIAM, son of William Beechey, the painter, born in London in 1796. In 1818 he accompanied Franklin in an expedition to discover the northwest passage, and the following year took part in a similar enterprise with Parry. In 1821 he was commissioned with his brother, H. W. Beechey, to examine by land the coasts of North Africa from Tripoli eastward, an account of which appeared in 1828. From 1825 he was commander of the *Blossom* in another Arctic expedition, by way of the Pacific and Bering Strait, of which a narrative was published in 1831. In 1854 he was given the rank of rear-admiral; he died in 1856.

Beechey, SIR WILLIAM, a fashionable portrait-painter, was born in 1753; died in 1839. In 1772 elected Royal Academician, and knighted in acknowledgment of his large picture of a cavalry review, including portraits of George IV, the Prince of Wales, etc. The complete catalogue of his works includes portraits of nearly all the leading personages of the day, but artistically he does not belong to the first rank of portrait-painters.

Bee-eaters, a family of fissirostris passerine birds, distributed over Africa, India, the Moluccas

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and Australia, chiefly known in Europe by the *Merops apicater*, or common bee-eater, a summer visitant to Russia and the Mediterranean borders. It is rare in Britain. For the most part they nest in colonies, depositing their eggs like the sand-martins, at the end of a tunnel.

Beef-eaters (usually but erroneously considered a corruption of *Fr. buffetiers*), yeomen of the guard of the sovereign of Great Britain, stationed by the sideboard at great royal dinners, and dressed after the fashion of the time of Henry VII.—Also a name for certain African insectorial birds (genus *Buphaga*) which feed on the larvae in the hides of buffaloes or other animals.

Beefsteak Club, the name of several clubs formed in London during the 18th and 19th centuries, the first in 1709, the second in 1735; Sheridan founded one in Dublin in 1749, of which Peg Woffington was president. The modern Beefsteak Club was founded by Toole, the actor, in 1876.

Beef-tea, a nourishing beverage for invalids, which may be prepared from lean beef by chopping it small, putting it with some cold water into a saucepan and letting it simmer for two or three hours (or more), also skimming off the fat. It is easy of digestion, and very nutritious. This should be distinguished from beef-extracts, sold in cans and jars, which are of no real value.

Beef-wood, the timber of some species of Australian trees belonging to the genus *Casuarina*, of a reddish color, hard, and close-grained, with dark and whitish streaks, chiefly used in fine ornamental work.

Bee-hawk, a name given to the honey-buzzard (*Pernis ptilorhynchus*), which preys on hymenopterous insects.

Beehive-houses, the archaeological name of primitive dwellings of unknown antiquity found in Scotland and Ireland. They are conical



Beehive-houses at Cahernamacturech, co. Kerry. In shape, of small size, formed of long stones, so laid, on a circular plan, that

each course is overlapped by that resting upon it. No cement is used in their construction.

Beejapoor (bē-ja-pūr'). See *Beja-poor*.

Beelzebub (bē-el'sā-bub; Hebrew, 'the god of flies'), the supreme god of the Syro-Phœnician peoples, in whose honor the Philistines had a temple at Ekron. With his name may be compared the epithet 'avertor of flies' applied to Zeus and later to Hercules. The use of *Beelzebub* in the New Testament has been the subject of much discussion, some asserting it to be an opprobrious form of *Beelzebub*, meaning the 'lord of dung,' others translating it 'lord of the dwelling,' and others again finding in the change from *b* to *l* only a natural linguistic modification.

Beer. See *Ale* and *Brewing*.

Beerbhoom. See *Birbhūm*.

Beersheba (bēr-shē'ba; now *Bir-es-Beba*, 'the well of the oath'), the place where Abraham made a covenant with Abimelech, and in common speech representative of the southernmost limit of Palestine, near which it is situated. It was here that General Allenby began his successful attack on the Turks, Oct. 31, 1917, culminating in the capture of Jerusalem, Dec. 11, 1917. See *Palestine*.

Bees-wax, a solid fatty substance containing in its purified state three chemical principles—myricin, cerin, and cerylol. It is not collected from plants, but elaborated from saccharine food in the body of the bee. (See *Bee*.) It is used for the manufacture of candles, for modeling, and in many minor processes. See *Wax*.

Beet (*Beta*), a genus of plants, nat. order Chenopodiaceae, distinguished by its fruit being enclosed in a tough woody or spongy five-lobed enlarged calyx. Two species only are known in general cultivation, namely, the sea-beet (*B. maritima*) and the garden beet (*B. vulgaris*). The former is a tough-rooted perennial, common on many parts of the British coast and sometimes cultivated for its leaves, which are an excellent substitute for spinach. Of the garden beet, which differs from the last in being of only biennial duration and in forming a tender fleshy root, two principal forms are known to cultivators, the chard beet and the common beet. In the chard beet the roots are small, white, and rather tough, and the leaves are furnished with a broad, fleshy midrib (*chard*), employed as a

vegetable by the French, who dress the ribs like sea-kale under the name of *poirée*. Some writers regard this as a peculiar species, and call it *Beta cicla* or *hortensis*. The common beet includes all the fleshy-rooted varieties, such as red beet (with a fleshy large carrot-shaped root), yellow beet, sugar-beet, mangel-wurzel, etc. The beet requires a rich light soil, and being a native of the Mediterranean region is impatient of severe cold, requiring to be taken up in the beginning of winter and packed in dry sand, or in pits like potatoes, the succulent leaves having been first removed. The beet may be taken out of the ground for use about the end of August, but it does not attain its full size and perfection till the month of October. From the white beet the French, during the wars under Napoleon I, succeeded in preparing sugar, that article, as British colonial produce, having been prohibited in France. Since that time, with the increase of chemical and technical knowledge, the making of beet-sugar has become an important industry in France, Germany, Austria, Russia, Belgium, and Holland, and has of late years been widely cultivated in the United States. The culture of the beet-root for sugar has been so developed that the production now equals and in some years surpasses that of cane sugar.

Beet-fly (*Anthomyia betæ*), a fly resembling the common fly but of smaller size, which deposits its eggs in the leaves of mangel-wurzels and other beets.

Beet Sugar. This substitute for the product of sugar-cane was first made in 1747 in Germany by Marggraf, who discovered that excellent sugar could be obtained from the common beet. In 1830 efforts were made in the United States to establish the beet-sugar industry, but it was not until 1876 that an adequately equipped factory was erected for the purpose, in Alvarado, Cal. Since that year many similar ones have been built, mostly in the Western States, and the industry may now be said to be firmly established.

Beethoven (bä'tövn), LUDWIG VAN, a great German musical composer, born at Bonn, Prussia, in 1770, studied under his father (a tenor singer), Pfeiffer, Van den Eeden, and Neefe; began to publish in 1783; became assistant court organist in 1785. At the age of 17 Beethoven played before Mozart, whom he astonished by his virtuosity, and who subsequently gave him a few lessons. He was sent by the Elector of Cologne to Vienna in 1792, where he was the pupil of Haydn and Albrechtsberger, and acquired a high reputation for pianoforte extemporisation before the merit of his

written compositions was fully understood. In or near Vienna almost all his subsequent life was spent, his artistic life in North Germany in 1796 being the most important break. He died March 26, 1827. His later life was rendered somewhat morbid by his deafness, of which first signs appeared in 1797. He had the head of Jove on the body of Bacchus and there was in him a strong dash of what in a lesser man would be termed insanity, with an alternation between the highest elevation of genius and the conduct of a fool or buffoon. His best works were published after 1800, two periods being observable: the first from 1800 to 1814, comprising *Symphonies* 2-8; opera *Fidelio* (originally *Leonore*), music to Goethe's *Egmont*, and the operas *Prometheus*, *Coriolanus*, *Kent*, *Stephen* and *Fidelio*; the second (in which the poetic school of musicians find the germs of the subsequent development through Schumann, Wagner, and Liszt) comprising the *Ninth Symphony*, *Missa Solemnis*, and the *Sonatas* Op. 102, 106, 109, 110, and 111.

Beetle (bē'tl), a name often used synonymous with the term Coleoptera, but restricted by others to include all those insects that have their wings protected by hard cases or sheaths called elytra. Beetles vary in size from a mere point to the bulk of a man's foot; the largest, the elephant beetle of America, being 4 inches long. The so-called 'black beetles' of kitchens and cellars are not properly beetles at all, but cockroaches, and of the order Orthoptera.

Beetle-stone, a nodule of coprolite, or iron-stone, so named from the resemblance of the insect coprolite to the body and limb of a beetle.

Beet-root. See *Beet*.

Befā'na (Ital., corrupted from *epiphania*, 'Epiphany'), a legendary housewife who, being too busy to see the wise men of the East on their way to the infant Christ, has been looking out for them ever since, being ignorant that they returned by another way. She is particularly concerned with children, and on Twelfth night stockings are hung out to receive her gifts. The name is also given to a ragged doll which appears in the streets and shops on the eve and day of Epiphany.

Beg, or *Bey* ('prince' or 'lord'), Turkey, a governor; or particularly the governor of a sanjak. Sometimes given loosely to superiors and persons of rank. It ranks between effendi and pasha.

Bega (bā'gā), CORNELIUS, a Dutch painter and engraver, born in Harlem in 1620, one of the ablest pupils of Adrian von Ostade. His best paintings are in the Berlin Museum, and the Pinakothek at Munich. He died of the plague in 1694.

Begas (bā'gās), KARL, a German historical and portrait painter, born 1794; died 1854. He was long court painter and professor at Berlin Academy, and painted the portraits of many eminent personages.—REINHOLD, German sculptor, younger son of Karl Begas, was born in 1831. He executed the statue of Schiller for the Gendarmen Markt in Berlin. Since 1870 he has actively dominated the plastic art in Prussia, some of the most noted products of his work being in Berlin.

Beggar-my-neighbor, a game at cards usually played by two persons, who share the pack, and, laying their shares face downwards, turn up a card alternately until an honor appears. The honor has to be paid for by the less fortunate player at the rate of four cards for an ace, three for a king, two for a queen, and one for a knave; but if in the course of payment another honor should be turned up the late creditor becomes himself a debtor to the amount of its value.

Beggar's Opera, The, an opera by John Gay, produced at Lincoln's Inn Fields January 29, 1728.

Beghards (beg'ards), or BEGUARDS, members of a religious body which arose in Flanders in the thirteenth century. They disclaimed the authority of princes, and refused to submit unconditionally to the rules of any order, but bound themselves to a life of extreme sanctity without necessarily quitting their secular vocations. They were persecuted in the latter half of the fourteenth century as heretics, and either dispersed or distributed over the Dominican and Franciscan orders.

Begharmi (be-gār'mi). See *Begirmi*.

Beg'lerbeg ('prince of princes'), the title among the Turks of a governor who has under him several begs, agas, etc.

Begonia (be-gō'ni-a), an extensive genus of succulent-stemmed herbaceous plants, order Begoniaceae, with fleshy oblique leaves of various colors, and showy unisexual flowers, the whole perianth colored. They readily hybridize, and many fine varieties have been raised from the tuberous-rooted kinds. From the shape of their leaves they have been called *elephant's ear*. Almost all the

plants of the order are tropical, and they have mostly pink or red flowers.

Beguards. See *Beghards*.

Beguines (be-gēnz'), an order of females, who, without taking the monastic vows, formed societies for devotion and charity, living in houses called *beguinages*. The order originated towards the end of the eleventh century, in Germany and the Netherlands, and was very flourishing in the twelfth and thirteenth centuries. They still exist in Holland, Belgium, and Germany, though the modern beguinage is an eleemosynary institution for lodging unmarried women rather than of the old type.

Be'gum, in the East Indies, a princess or lady of high rank.

Behaim (bā'hīm), or BEHEM, MARTIN, a mathematician and cosmographer, born at Nürnberg about 1430. He went from Antwerp to Lisbon with a high reputation in 1480, sailed in the fleet of Diogo Cam on a voyage of discovery (1484-86), and explored the islands on the coast of Africa as far as the Congo. In 1486 he settled in Fayal, where he remained for several years, and assisted in the discovery of the other Azores; was afterwards knighted, and returned to his native country, where, in 1492, he constructed a terrestrial globe, still preserved. He died at Lisbon in 1506.

Beham (bā'ham), the name of two engravers and painters.—1. BARTHEL, pupil of Dürer, born at Nürnberg 1502; died at Venice 1540. A picture by him in the Pinakothek at Munich ranks among the masterpieces of the old German school.—2. HANS SEBALD, born at Nürnberg in 1500; brother of Barthel. He was one of Dürer's ablest pupils, but his subjects were often gross. His later career was that of a tavern and brothel keeper, and he died or was put to death about 1550.

Behar (be-hār'), a prov. of Hindustan, in Bengal, area 44,139 sq. miles. It is generally flat, and is divided into almost equal parts by the Ganges, the chief tributaries of which in the prov. are the Gogra, Gandak, Kusi, Mahananda, and Soane. There is an extensive canal and irrigation system. Opium and indigo are largely produced. It is the most densely peopled prov. of India; pop. 24,185,000. Patna is the capital.—The town of Behar, in the Patna district, contains some ancient mosques and the ruins of an old fort; it is a place of large trade. Pop. 45,063.

Beheading (bē-hed'ing). See *Capital Punishment*.

Behemoth (bē'hē-moth), the animal described in Job, xl. The description is most applicable to the hippopotamus, and the word seems to be of Egyptian origin and to signify 'water-ox'; but it has been variously asserted to be the ox, the elephant, the crocodile, etc.

Be'hen, OIL OF. Same as Oil of Ben.

Behistun (bā-his-tūn'), or BIS'UTUN, a mountain near a village of the same name in Persian Kurdistan, celebrated for the sculptures and cuneiform inscriptions cut upon one of its sides—a rock rising almost perpendicularly to the height of 1700 feet. These works, which begin about 300 feet from the ground, were executed by the orders of Darius I, King of Persia, and set forth his genealogy and victories. To receive the inscriptions the rock was carefully polished and coated with a hard siliceous varnish. Their probable date is about 515 B.C. They were first copied and deciphered by Rawlinson.

Behn (ben), APHRA, English writer of plays and novels, born 1640; maiden name Johnson. As a child she went out to Surinam, where she became acquainted with the slave Oroonoko, whom she made the subject of a novel. On her return to England she married Mr. Behn, a London merchant of Dutch extraction, but was probably a widow when sent by Charles II to serve as a spy at Antwerp during the Dutch war. She afterwards became fashionable among the men of wit and pleasure of the time as a prolific writer of plays, poems, and stories, now more notorious for their indecency than their ability. She died in 1689, and was buried in Westminster Abbey.

Behring, or BERING (bā'ring), VITUS, a famous navigator, born in 1680 at Horsens, Jutland. The courage displayed by him as captain in the navy of Peter the Great during the Swedish wars led to his being chosen to command a voyage of discovery in the Sea of Kamchatka. In 1728 and subsequently he examined the coasts of Kamchatka, Okhotsk, and the north of Siberia, ascertaining the relation between the north-eastern Asiatic and northwestern American coasts. Returning from America in 1741, he was wrecked upon the desert island of Awatska (Behring's Island), and died there.

Behring, or Bering, Strait, Sea, and Island. THE STRAIT is the channel separating the continents of Asia and America, and connecting the North Pacific with

the Arctic Ocean; breadth at the narrowest part, between Cape Prince of Wales and East Cape, about 86 miles; depth in the middle from 20 to 80 fathoms. It is frozen in winter, and seldom free from fog or haze. Though named after Vitus Behring, it was only fully explored by Cook in 1778.—**BEHRING SEA**, sometimes called the Sea of Kamchatka, is the northern portion of the North Pacific Ocean lying between the Aleutian Islands and Behring Strait.—**BEHRING ISLAND**, the most westerly of the Aleutian chain, off the east coast of Kamchatka. There are few inhabitants; the island is without woods.

Beira (bā'i-rā) a division and former province of Portugal, between Spain and the Atlantic, and bounded by the Douro on the N. and by the Tagus and Estremadura on the S. Surface mountainous, with the highest level in Portugal (8540 feet). Area, 9244 square miles. Chief town, Coimbra. The town of Beira is a seaport of Portuguese East Africa, with a good harbor and export of gold, wax and rubber.

Beirut. See *Beirut*.

Beit-el-Fagih (bāt-el-fā'kē), a town of Yemen, Arabia, principal market for Mocha coffee. Pop. 8000.

Beja (bā'sha), a town of Portugal, province of Alemtejo, with an old cathedral and some Roman remains. Pop. 8900.

Bejapoor (bē-ja-pūr') a ruined city of Hindustan, in the Bombay presidency, near the borders of the Nizam's dominions, on an affluent of the Krishna. It was one of the largest cities in India until its capture by Aurungzeb in 1686. The ruins, of which some are in the richest style of oriental art, are chiefly Mohammedan, the principal being Mahomet Shah's tomb, with a dome visible for 14 miles, and a Hindu temple in the earliest Brahmanical style. Pop. about 17,000.

Bejar (bā-hār'), a fortified town of Spain, prov. Salamanca, with woolen manufactures. Pop. 9488.

Beke (bēk), CHARLES TILSTONE, an English traveler, born in 1800. He studied law at Lincoln's Inn, and having devoted much attention to ancient history and kindred subjects he published in 1834 *Origines Biblicæ*, researches in primitive history. Supported by private individuals, he joined Major Harris in the exploration of Abyssinia, of which he published an account in 1846. Two works on the Nile followed in 1847 and 1849. In 1856 he sought unsuccessfully to establish trade relations with Abyssinia.

He also made journeys to Harra in 1861, to Abyssinia in 1865, and to the head of the Red Sea in 1874, in which year he died.

Bekos (bē'kōsh), a town of Hungary, at the junction of the Black and White Kőrös, with a trade in flax, cattle, corn, wine, etc. Pop. 25,485.

Bekker (bek'er), IMMANUEL, a German classical scholar, born in 1785; died in 1871. His critical editions of the texts of the most important Greek and Latin authors, based on an examination and comparison of MSS., are very valuable, embracing Plato, Aristotle, Aristophanes, Thucydides, Livy, and Tacitus. He also published contributions to the philology of the Romance tongues.

Bel, the chief deity of the ancient Babylonians. See *Babylon*.

Bel, also BELGAR, the Hindu name of the *Egle marmelos*, or Bengal quince. The fruit, which is not unlike an orange, is slightly aperient; a perfume and yellow dye are obtained from the rind, and a cement from the mucus of the seed.

Bela (bē'la), the name of four kings of Hungary belonging to the Arpad dynasty.—BELA I competed for the crown with his brother Andrew, whom he succeeded in 1061. He died in 1063, after introducing many reforms.—BELA II mounted the throne in 1131, and died in 1141.—BELA III, crowned 1174, corrected abuses, repelled the Bohemians, Poles, Austrians, and Venetians, and died in 1196.—BELA IV, succeeded his father Andrew II in 1235; was shortly after defeated by the Tartars and detained prisoner for some time in Austria, where he had sought refuge. In 1244 he regained his throne, and defeated the Austrians, but was in turn beaten by the Bohemians. Died in 1270.

Bel and the Dragon, a book of the Apocrypha, forming a sort of addition to the book of Daniel. In it Daniel is shown as exposing the imposture of the priests of Bel and killing a sacred dragon.

Belasco (be-las'ko), DAVID, actor and adapter of plays, born 1862. His first success was *Hearts of Oak*. There rapidly followed *The Heart of Maryland*, *Zaza*, *The Darling of the Gods*, and other pieces, one of which is the subject of Puccini's opera, *The Girl of the Golden West*.

Belbeis (bel-bās), a town of Lower Egypt, 28 miles N. N. E. of Cairo, on the road to Syria. Pop. 11,267.

Belem (bē-len'), a town of Portugal, on the right bank of the

Tagus, now the fashionable suburb of Lisbon. Has an old monastery which contains the remains of Vasco da Gama, Camoens, and a number of the Portuguese kings.

Belemnite (bel'em-nit), a name for straight, solid, tapering, dart-shaped fossils, popularly known as



Belemnites.

1. Belemnites antiquus—ventral side.
2. Belemnites Oweni (restored). A, Guard.
3. Phragmacone. B, Muscular tissue of mantle.
4. Infundibulum. E, Uncinated arms. F, Tentacula. G, Ink-bag.
5. Belemnite.—British Museum.

arrow-heads, thunderbolts, finger-stones, etc.

Belfast (bel-fast'), a seaport of Ireland (in 1888 declared a city), the principal town of Ulster, and county town of Antrim, built on low alluvial land on the left bank of the Lagan, at the head of Belfast Lough. The streets are spacious and regular, the houses mostly of brick. There are a number of handsome Episcopal churches, including the cathedral, but the most magnificent edifice is the Roman Catholic St. Peter's. The population is largely Protestant, and there are Methodist and Presbyterian theological seminaries. The chief educational institution is the Queen's University. Chief public buildings: the town-hall; the range of buildings for the customs, inland revenue, and post-office; the Ulster Hall; the Albert memorial clock-tower. In the suburbs are several public parks and a botanic garden. The iron shipbuilding industry of Belfast is one of the most important in the United Kingdom, some of the largest ships in the world having been launched there, among them being the *Oceanic*, the ill-fated *Titanic*, the *Baltic*, etc. Belfast Lough is about 15 miles long, and 6 miles

broad at the entrance, gradually narrowing as it approaches the town. The harbor and dock accommodation is now extensive, new docks having been recently added. Belfast is the center of the Irish linen trade, and has the majority of spinning-mills and power-loom factories in Ireland. Previous to about 1830 the cotton manufacture was the leading industry of Belfast, but nearly all the mills have been converted to flax-spinning. The importance of the shipbuilding trade has been mentioned; there are breweries, distilleries, flour-mills, oil-mills, foundries, print-works, tan-yards, chemical works, ropeworks, etc. The commerce is large. An extensive direct trade is carried on with British North America, the Mediterranean, France, Belgium, Holland, and the Baltic, besides the regular traffic with the principal ports of the British islands. Belfast is comparatively a modern town, its prosperity dating from the introduction of the cotton trade in 1777. It has suffered severely at various times from faction-fights between Catholics and Protestants, the more serious having been in the years 1880, 1886, and 1907. Belfast is the largest city in Ireland, its population in 1910 being 386,576. It is divided into four parliamentary divisions, North, South, East, and West, each returning one member. The total area is 18,594 acres.

Belfast (bel'fast), a city and seaport of Maine on Penobscot Bay, 30 miles from the ocean, with manufactures of boots and shoes, clothing, etc., canning factories, good harbor and shipbuilding trade. Pop. 6500.

Belfort, or **BÉFORT** (bā-för), a small French, fortified town and territory of France, in the former dep. Haut Rhin, on the Savoureuse, well built, with an ancient castle and a fine parish church. In the Franco-German war it capitulated to the Germans only after an investment of more than three months' duration (1870-71). It has since been greatly strengthened. Belfort, with the district immediately surrounding it, is the only part of the department of Haut Rhin which remained to France on the cession of Alsace to Germany. Pop. of territory, 95,421, of which 27,805 belong to the town.

Belfry, a bell-tower or bell-turret. A bell-tower may be attached to another building, or may stand apart; a bell-turret usually rises above the roof of a building, and is often placed above the top of the western gable of a church. The part of a tower containing a bell or bells is also called a belfry.

Belgæ (bel'jē), a collection of German and Celtic tribes who anciently inhabited the country extending

between the Marne and Seine and the lower Rhine, and bounded northwest to the sea. Cæsar, on his invasion of Britain, found them established also in Kent and Sussex.

Belgaum (bel-gā'um), a town and fortress in Hindustan, Bombay Presidency, district of Belgaum, on a plain 2500 feet above the sea-level. In 1818 the fort and town were taken by the British, and from its healthy situation it was selected as a permanent military station. Pop. 86,878. It is the capital of a district of the same name, 4657 sq. miles in area.

Belgica (bel'ji-ka), a part of ancient Gaul, originally the land of the Bellovaci and Atrebatæ, who lived in the neighborhood of Amiens, and perhaps of Senlis.

Belgiojoso (bel-jo-yō'so), a town in Italy, province of Pavia, with an old castle, in which Francis was lodged after the battle of Pavia, 1525. Pop. about 4000.

Belgiojoso, **CHRISTINA**, PRINCESS (bel-jo-yō'so), an Italian lady who took a distinguished part in the revolutionary movement of 1830, and again in 1848 when she raised a volunteer corps at her own expense. After an exile of some years she returned under the amnesty of 1853, regained her property, and supported the policy of Cavour. Died 1883, aged sixty-three.

Belgium (bel'ji-um; French, *Belgique*; German, *Belgien*), an European kingdom, bounded by Holland, the North Sea or German Ocean, France, and Germany; greatest length, 165 miles; greatest breadth, 120 miles; area, 11,340 square miles. For administrative purposes it is divided into nine provinces: Antwerp, Brabant, East Flanders, West Flanders, Hainaut, Liège, Limburg, Luxembourg, and Namur. The total pop. by census (1910) 7,423,784. Brabant, a metropolitan province, occupies the center. The capital is Brussels; other chief towns are Antwerp, Ghent, and Liège. The country may be regarded roughly as an inclined plain, falling away in height from the southern district of the chain of the Ardennes until in the N. and W. it becomes only a few feet above sea level. The surface rocks in the south consist of slate, old red sandstone, and mountain limestone; towards the N. W. rich coal and iron field stretches across the provinces of Hainaut and Liège, skirting those of Namur and Luxembourg. North and west of this coal-field a more recent formation is found, covered by land by deep beds of clay and on the coast by sand-dunes. The chief rivers

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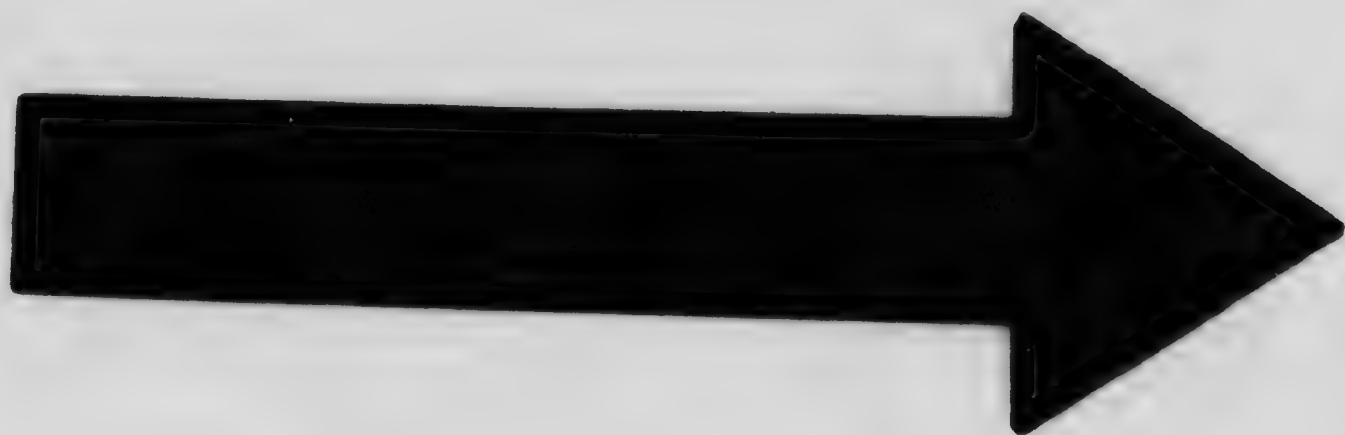
are the Scheldt or Schelde and Meuse or Mass, which cross the country in a northeasterly direction; other navigable streams are the Dender, Dyle, Lys, Ourthe, Rupel, and Sambre. There are also a number of canals. The climate bears a considerable resemblance to that of the same latitudes in England; healthiest in Luxemburg and Namur, unhealthy in the fens of Flanders and Antwerp. About one-sixth of the whole surface of the kingdom is occupied by wood, Luxemburg and Namur being very densely wooded. These woods, the remains of the ancient forest of Ardennes, consist of hard wood, principally oak, and furnish valuable timber, besides many tons of bark both for the home-tanneries and for exportation, and large quantities of charcoal. South Brabant also possesses several fine forests, among others that of Soignies; but in the other provinces the timber—mostly varieties of poplar—is grown in small copses and hedgerows.

About four-fifths of the whole kingdom is under cultivation, and nearly eleven-twelfths of it profitably occupied, leaving only about one-twelfth waste. In the high lands traversed by the Ardennes the climate is ungenial, and the soil shallow and stony. On the natural pastures here, however, much stock is reared, and a hardy breed of horses, while large herds of swine feed in the forests. Where the soil is arable it is turned to account, and the vine has been grown with fair success in some districts. In the opposite extremity of Belgium is an extensive tract known as the Campine, composed for the most part of barren sand, with here and there a patch of more promising appearance. Agricultural colonies, partly free and partly compulsory, have been planted in different parts of this district with considerable success, some of the finest cattle and much excellent dairy produce coming from it. But a portion of it remains untouched. With exception of the two districts now described, there is no part of Belgium in which agriculture does not flourish; but it reaches its highest in E. and W. Flanders. Flemish husbandry partakes more of the nature of garden than of field culture, being very largely spade-farming. The chief corn crops are wheat, rye, and oats (600,000 to 700,000 acres each); but they do not suffice for the wants of the country. The chief green crops are potatoes, beet (partly for sugar), and flax, the last a most valuable crop in the Flemish rotation. The cattle are good and numerous. The horses of Flanders are admirably adapted for

draught, and an infusion of their blood has contributed not a little to form the magnificent teams of the London draymen. The minerals of Belgium are highly valuable. They are almost entirely confined to the four provinces of Hainaut, Liège, Namur, and Luxemburg, and consist of iron and coal, lead, manganese, and zinc, the first two minerals being far the most important. The iron-working district lies between the Sambre and the Meuse and also in the province of Liège. At present the largest quantity of ore is raised in that of Namur. The coal-field has an area of above 500 square miles. The quantity of coal raised annually is about 25,000,000 tons. The export of this, chiefly to France, forming one of the largest and most valuable of all the Belgian exports. Belgium is also abundantly supplied with building-stone, pavement limestone, roofing-slate, and marble.

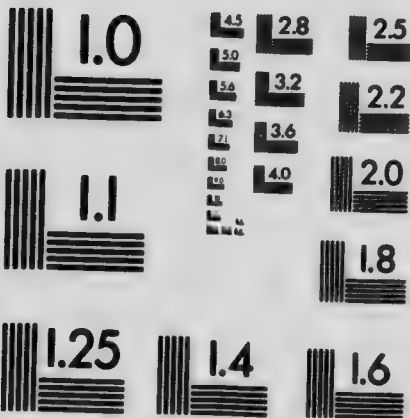
The industrial products of Belgium are very numerous, and are mostly of high character. The chief are those connected with linen, wool, cotton, metal, and leather goods. In respect of manufactures, the fine linens of Flanders and lace of South Brabant are of European reputation. Scarcely less celebrated are the carpets and porcelain of Tournay, the cloth of Verviers, the extensive foundries, machine-works, and other iron establishments of Liège. The carpets to which Brussels gives its name are now made chiefly in other countries. The commerce of Belgium is large and increasing. Apart from the value of her own products, she is admirably situated for the transit trade of Central Europe, to which her fine harbor of Antwerp and excellent railway and canal system minister. The exports of Belgian produce and manufactures, which in 1840 were valued at \$28,000,000, have risen to \$550,000,000. The imports for home consumption amount to some \$700,000,000. The articles of import are chiefly cereals, raw cotton, wool, and colonial produce; those of export principally coal and flax, tissues of flax, cotton and wool, machinery, etc. More than a third of the exports of Belgian produce and manufactures are sent to France. The external trade is chiefly carried on by means of foreign (British) vessels.

The Belgian population is the densest of any European state (over 600 per square mile), and is composed of two distinct races—Flemish, who are of German, and Walloons, who are of French extraction. The former, by far the more numerous, have their principal locality in Flanders; but also prevail throughout



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Antwerp, Limburg, and part of South Brabant. The latter are found chiefly in Hainaut, Liège, Namur, and part of Luxemburg. The Flemings speak a dialect of German, and the Walloons a corruption of French, with a considerable infusion of words and phrases from Spanish and other languages. French is the official and literary language, though Flemish is also successfully employed in literature. Almost the entire population is Roman Catholic, and there are over 1500 convents, with nearly 25,000 inmates. Protestantism is fully tolerated, and even salaried by the state, but cannot count a large number of adherents. Improved means of education are now at the disposal of the people, every commune being bound to maintain at least one school for elementary education, the government paying one-sixth, the province one-sixth, and the commune the remainder of the expenditure. In all the large towns colleges (*athénées*) have been established; while a complete course for the learned professions is provided by four universities, two of them, at Ghent and Liège, established and supported by the state; one at Brussels, the Free University, founded by voluntary association; and one at Louvain, the Catholic University, founded by the clergy. Although the condition of the population is, for the most part, one of comfort, yet in Flanders and South Brabant, where it is 800 per square mile, a fourth of the people is dependent on total or occasional relief, and pauper riots have repeatedly occurred.

By the Belgian constitution the executive power is vested in a hereditary king; the legislative, in the king and two chambers—the senate and the chamber of representatives—both elected by a qualified universal suffrage, the former for eight years, and the latter for four, but one-half of the former renewable every four years, and one-half of the latter every two years. Each of the provinces is administered by a governor and is subdivided into *arrondissements administratifs* and *arrondissements judiciaires*; subdivided again, respectively, into *cantons de milice* and *cantons de justice de paix*. Each canton is composed of several communes, of which the sum total is 2514. The army is formed by conscription, to which every able man who has completed his nineteenth year is liable, and also by voluntary enlistment. The peace strength (1910) is 40,000; war strength 85,000; adding to this the militia and the unorganized available force, the total reaches 350,000. The navy is confined to a few steamers and a small flotilla

of gunboats. The estimated revenue for 1906, chiefly from railways, direct taxation, and transport dues, was about \$108,000,000, the estimated expenditure \$110,000,000. Nearly one-fourth of the expenditure is in payment of interest on the national debt, the sum total of which is about \$620,000,000. The coin weights, and measures are the same, both in name and value, as those of France.

History.—The territory now known as Belgium originally formed only a section of that known to Caesar as the territory of the Belgæ, extending from the right bank of the Seine to the left bank of the Rhine, and to the ocean. This district continued under Roman sway till the decline of the empire; subsequently formed part of the kingdom of Clovis; and then of that of Charlemagne, whose ancestors belonged to Landen and Herstal on the confines of the Ardennes. After the breaking up of the empire of Charlemagne Belgium formed part of the kingdom of Lotharingia under Charlemagne's grandson, Lothaire; Artois and Flanders, however, belonging to France by the treaty of Verdun.

For more than a century this kingdom was contended for by the kings of France and the emperors of Germany. In 953 it was conferred by the Emperor Otto upon Bruno, Archbishop of Cologne, who assumed the title of archduke, and divided it into two duchies: Upper and Lower Lorraine. In the frequent struggle which took place during the eleventh century Luxemburg, Namur, Hainaut, and Liège usually sided with France, while Brabant, Holland, and Flanders commonly took the side of Germany. The contest between the civic and industrial organizations and feudalism, which went on through the twelfth and thirteenth centuries, and in which Flanders bore a leading part, was temporarily closed by the defeat of the Ghentese under Van Artevelde in 1382. In 1384 Flanders and Artois fell to the house of Burgundy, which in less than a century acquired the whole of the Netherlands. The death of Charles the Bold at Nancy, in his attempt to raise the duchy into a kingdom (1477), was followed by the succession and marriage of his daughter, Mary of Burgundy, by which the Netherlands became an Austrian possession. With the accession, however, of the Austrian house of Hapsburg to the Spanish throne, the Netherlands, after a brief period of prosperity attended by the spread of the reformed religion, became the scene of increasingly severe persecution under Charles V and Philip II of Spain. Driven to rebellion—

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the seven northern states, under William of Orange, the Silent, succeeded in establishing their independence, but the southern portion, or Belgium, continued under the Spanish yoke.

From 1598 to 1621 the Spanish Netherlands were transferred as an independent kingdom to the Austrian branch of the family by the marriage of Isabella, daughter of Philip II, with the Archduke Albert of Austria. He died childless, however, and they reverted to Spain. After being twice conquered by Louis XIV, conquered again by Marlborough, coveted by all the powers, deprived of territory on the one side by Holland and on the other by France, the Southern Netherlands were at length, in 1714, by the peace of Utrecht, again placed under the dominion of Austria, with the name of the Austrian Netherlands. During the Austrian war of succession the French under Saxe conquered nearly the whole country, but restored it in 1748 by the peace of Aix-la-Chapelle. The Seven Years' War (1756-63) did not affect Belgium, and in that period, and during the peace which followed, she regained much of her prosperity under Maria Theresa and Charles of Lorraine. On the succession of Joseph II, the 'philosophic emperor,' a serious insurrection occurred, the Austrian army being defeated at Turnhout, and the provinces forming themselves into an independent state as united Belgium (1790). They had scarcely been subdued again by Austria before they were conquered by the revolutionary armies of France, and the country divided into French departments, the Austrian rule being practically closed by the battle of Fleurus (1794), and the French possession confirmed by the treaties of Campo Formio (1797) and Lunéville (1801).

In 1815 Belgium was united by the Congress of Vienna to Holland, both countries together forming one state, the Kingdom of the Netherlands. This union lasted till 1830, when a revolt broke out among the Belgians, and soon attained such dimensions that the Dutch troops were unable to repress it. A convention of the great powers assembled in London, favored the separation of the two countries, and drew up a treaty to regulate it; the National Congress of Belgium offering the crown, on the recommendation of England, to Leopold, prince of Saxe-Coburg, who acceded to it under the title of Leopold I, on July 21, 1831. Leopold II succeeded his father in 1865, and was succeeded by his son, Albert I, in Dec., 1909. In 1885, on the constitution by the Congress of Berlin of the Congo Free State, in Central Africa, Leopold II was invited to become its sovereign. He transferred

his sovereignty to Belgium in 1908. Upon the outbreak of war between Germany and France, in 1914, Germany appealed to Belgium, whose neutrality was guaranteed under treaty by both Prussia and England, to permit the passage of troops against France. Belgium refused and Britain came to her defense. Then the Germans invaded the country, destroying many villages and bombarding the principal cities. See *European War*.

Belgrade (bel-grād') capital of Serbia, on the right bank of the Danube in the angle formed by the junction of the Save with that river, consists of the citadel or upper town, on a rock 100 feet high; and the lower town, which partly surrounds it. Of late years buildings of the European type have multiplied, and the older ones suffered to fall into decay. The chief are the royal and episcopal palaces, the government buildings, the cathedral, barracks, bazars, national theater, and various educational institutions. It manufactures carpets, silk stuffs, hardware, cutlery, and saddlery; and carries on an active trade. Being the key of Hungary, it was long an object of fierce contention between the Austrians and the Turks, remaining, however, for the most part in the hands of the Turks until its evacuation by them in 1867, when it was finally handed over to the Servians, and has since been the capital of the kingdom. Following the annexation of Bosnia and Herzegovina by Austria-Hungary, Belgrade became the center of an open Pan-Slav, anti-Austrian campaign. On June 28, 1914, the Archduke Francis Ferdinand, heir to the thrones of Austria-Hungary, and his wife, the Duchess of Hohenberg, were murdered in Serajevo, capital of Bosnia; and Austria declared that this crime had been promoted by Pan-Slavs at Belgrade. Certain demands were made on Serbia; these were refused and war was the result. The Austrian army occupied Belgrade on December 2, 1914, but evacuated it December 15, after a prolonged battle in which the Servians were victorious. On October 9, 1915, Belgrade again fell into the hands of Austria-Hungary. Pop. (1910) 90,000.

Belial (bē'yal), a word which by the translators of the English Bible is often treated as a proper name, as in the expressions 'son of Belial,' 'man of Belial.' In the Old Testament, however, it ought not to be taken as a proper name, but it should be translated 'wickedness' or 'worthlessness.' To the later Jews Belial seems to have become what Pluto was to the Greeks, the name of the ruler of the infernal regions; and in II Cor., vi: 15, it seems to be used as a

Belisarius

name of Satan, as the personification of all that is bad.

Belisarius (be-li-sā'ri-us; in Slavonic *Beli-tsar*, 'White Prince'), the general to whom the Emperor Justinian chiefly owed the splendor of his reign; born in Illyria about 505 A.D. He served in the body-guard of the emperor, soon after obtained the chief command of an army on the Persian frontiers, and in 530 gained a victory over a superior Persian army. The next year, however, he lost a battle, and was recalled. In the year 532 he checked the disorders in Constantinople arising from the Green and Blue factions; and was then sent with 15,000 men to Africa to recover the territories occupied by the Vandals. He took Carthage and led Gelimer, the Vandal king, in triumph through Constantinople. Dissensions having arisen in the Ostrogothic kingdom, he was sent to Italy, and though ill supplied with money and troops, stormed Naples, held Rome for a year, took Ravenna, and led captive Vitiges, the Gothic king. He rendered honorable service in later campaigns in Italy and against the Bulgarians, but was accused of conspiracy and flung into prison. He afterwards seems to have recovered his property and dignities, the story of Tzetzes (a twelfth-century monk), that Belisarius wandered about as a blind beggar, being probably an invention. He died in 565. The only weaknesses in the character of Belisarius appear in connection with his profligate wife Antonina, an associate of the Empress Theodora.

Belize (be-lēz'), the capital and only trading port of British Honduras, situated at the mouth of the southern arm of the river Belize. Exports: chiefly mahogany, rosewood, logwood, cedar, cocoa-nuts, and sugar. Pop. about 10,000.

Belknap (bel'nap), JEREMY, an American author, born in 1744; minister at Dover, New Hampshire, and afterwards at Boston. Died in 1798. Besides his *History of New Hampshire*, he published two volumes of American biography, and a number of political, religious, and literary tracts.

Bell, a hollow, somewhat cup-shaped, metal sounding instrument of metal. The metal from which bells are usually made (by founding) is an alloy, called bell-metal, commonly composed of eighty parts of copper and twenty of tin. The proportion of tin varies, however, from one-third to one-fifth of the weight of the copper, according to the sound required, the size of the bell, and the impulse to be given. The clearness and

richness of the tone depend upon the metal used, the perfection of its casting, and also upon its shape; it having been shown by a number of experiments that the well-known shape with a thick lip is the best adapted to give a perfect sound. The depth of the tone of a bell increases in proportion to its size. A bell is divided into the *body* or *barrel*, the *clapper* or *cannon*, and the *clapper* or *tongue*. The *lip* or *sound-bow* is that part where the bell is struck by the clapper.

It is uncertain whether the jangling instruments used by the Egyptians and Israelites can be correctly described as bells; but it is certain that bells of considerable size were in early use in China and Japan, and that the Greeks and Romans used them for various purposes. They are said to have been first introduced into Christian churches about 400 A.D. by Paulinus, Bishop of Nola, in Campania (whence *campana* and *nola* as old names of bells), although their adoption on a wide scale does not become apparent until after the year 550, when they were introduced into France. Benedict Biscop, abbot of Wearmouth, seems to have imported bells from Italy to England in 680, but their use in Ireland and Scotland is probably of earlier date. The oldest of those existing in Great Britain and Ireland, such as the 'bell of St. Patrick's will' and St. Ninian's bell, are quadrangular and made of thin iron plates hammered and riveted together. Until the thirteenth century they were of comparatively small size, but after the casting of the Jacqueline of Paris (6½ tons) in 1400 their weight rapidly increased. Among the more famous bells are the bell of Cologne, 27½ tons; of Moscow (the second bell), 128 tons; a bell in a pagoda in Upper Burma, 80 tons; Peking, 53 tons; Olmutz, 17 tons; Great Peter, York Minster, 12½ tons; Great Paul, St. Paul's Cathedral, 16¾ tons; Big Ben, of London, 13½ tons; and various others of later date. The United States possesses one of great historical interest and highly revered, the Independence Bell of the old Philadelphia State House, the most famous of American historical relics.

Besides their use in churches, bells are employed for various purposes, the most common use being to summon attendants or domestics in private houses, hotels, etc. Bells for this purpose are of small size and may be held in the hand and rung, but most commonly are rung by means of wires stretched from the various apartments to the place where the bells are hung. Bells rung by electricity are

now common in residences, hotels and other establishments.

Bells, as the term is used on shipboard, are the strokes of the ship's bell that proclaim the hours. Eight bells, the highest number, are rung at noon and every fourth hour afterwards, i. e., at 4, 8, 12 o'clock, and so on. The intermediary periods are indicated thus: 12.30, one bell; 1 o'clock, 2 bells; 1.30, 3 bells, etc., until the eight bells announce 4 o'clock, when the series recommences, 4.30, one bell; 5 o'clock, two bells, etc.

Bell, ALEXANDER GRAHAM, inventor of the telephone, was born at Edinburgh in 1847; son of Alexander Melville Bell of the University of Edinburgh and grandson of Alexander Bell, two scientists who made a life study of visible speech for the deaf. In 1870 he settled in Canada and two years later became instructor in vocal physiology at the Boston University. He made analyses of the variations and effects of sound waves and experimented with a multiple telegraph apparatus. During the winter of 1874-75 he worked to perfect an apparatus that would send the human voice over a wire. On March 10, 1876, the first actual wire message of which there is any record was transmitted by Bell to his assistant, Thomas A. Watson, in a Boston hotel. On January 25, 1915, thirty-nine years after transmitting his first message, he repeated the same message in New York and it was received over the wire by Mr. Watson in San Francisco. Bell was also the inventor of the telephone probe for discovering the location of bullets in the human body, the photophone, and the tetrahedral kite.

Bell, ALEXANDER MELVILLE, father of the above, was born at Edinburgh in 1819. He was a distinguished teacher of elocution in that city; in 1865 removed to London to act as a lecturer in University College; and in 1870 went to Canada and became connected with Queen's College, Kingston. He is inventor on the system of 'visible speech.' He died August 7, 1905.

Bell, ANDREW, the author of the mutual instruction or the 'Madras' system of education, was born at St. Andrews, Scotland, in 1753; died in England in 1832. He took orders in the Church of England, and in 1789 went to India, where he became chaplain at Fort St. George, Madras, and manager of the institution for the education of the orphan children of European soldiers. Failing to retain the services of properly qualified ushers, he resorted to the expedient of employing the scholars in mutual instruction; and after his return to Britain published a treatise on the

monitorial or Madras system of education. Joseph Lancaster, a dissenter, began to work on the system, and a considerable amount of friction and rivalry ensued between the dissenters and the church party. Dr. Bell lived long enough to witness the introduction of his system into 12,973 national schools, educating 900,000 English children, and to know that it was employed extensively in almost every other civilized country. In later life he became a prebendary of Westminster, and was master of Sherburn Hospital, Durham. At his death he left \$600,000 for the erection and maintenance of schools on his favorite system, \$300,000 of which was set apart for his native town.

Bell, SIR CHARLES, anatomist and surgeon, was born at Edinburgh in 1774, and studied anatomy there under the superintendence of his brother John (see below). In 1804 he went to London and soon distinguished himself as a lecturer on anatomy and surgery. In 1812 he was appointed surgeon to the Middlesex Hospital, and in 1821 he communicated to the Royal Society a paper on the nervous system, containing among other things the important discovery that the nerve-filaments of sensation are distinct from those of motion. It at once attracted general attention and established his reputation. In 1824 he accepted the chair of anatomy and surgery to the London College of Surgeons, and in 1836 that of surgery in the University of Edinburgh. He died suddenly in 1842. He was the author of many professional works of high repute on anatomy and surgery, and of the Bridge-water Treatise, *The Hand: its Mechanism and Vital Endowments as evincing Design*. He received the honor of knighthood in 1831.

Bell, GEORGE JOSEPH, brother of Sir Charles and John Bell (see both names), an eminent lawyer, was born in Edinburgh in 1770, died 1843. He is the author of several standard law-books, the most important of which is *The Principles of the Law of Scotland*, which has gone through several editions.

Bell, HENRY, the first successful applier of steam to the purposes of navigation in Europe, was born in Linnlithgowshire 1767; died at Helensburgh 1830. He was apprenticed as a millwright, and afterwards served under several engineers, including Rennie. He settled in Glasgow in 1796, and subsequently in Helensburgh. In 1798 he turned his attention specially to the steam-boat, the practicability of steam navigation having been already demonstrated. In 1812 the

'Comet,' a small thirty-ton vessel built at Glasgow under Bell's directions, and driven by a three-horse-power engine made by himself, commenced to ply between Glasgow and Greenock, and continued to run for a number of years. This was the beginning of steam navigation in Europe. It has been asserted that Fulton, who started a steamer on the Hudson in 1807, obtained his ideas from Bell in the previous year. Bell is also credited with the invention of the 'discharging machine' used by calico-printers. A monument has been erected to his memory at Dunglass Point on the Clyde.

Bell, HENRY GLASSFORD, poet and miscellaneous writer, born in Glasgow 1803; died 1874. He was educated at the Glasgow High School and Edinburgh University. Author of several volumes of poetry, a *Life of Mary, Queen of Scots*, etc.

Bell, HENRY H., an American rear-admiral, born in North Carolina 1808; drowned in the Osaka River, Japan, 1868. Fought under Farragut; commanded a division of the fleet in the attack on New Orleans, and on the occupation of that city hauled down the state flag in the face of a mob.

Bell, JAMES FRANKLIN, an American army officer, born in 1856. He took part in the Philippine campaign in 1898, and was awarded a medal of honor for gallantry in action in Luzon; provost-marshal general of Manila until 1901, when he was made brigadier-general; chief of general staff 1906-10; made major-general 1907.

Bell, JAMES MONTGOMERY, American soldier, born in 1837. He entered the army in 1862, served in the Civil War, in various Indian campaigns and in the Philippines; retired in 1901 with the rank of brigadier-general.

Bell, JOHN, a distinguished surgeon, elder brother of Sir Charles Bell, born at Edinburgh 1763; died at Rome 1820. After completing his professional education he traveled for a short time in Russia and the N. of Europe; and on his return to Edinburgh began to deliver extramural lectures on surgery and midwifery. These lectures, which he delivered between the years 1786 and 1796, were very highly esteemed, and speedily brought him into an extensive practice as a consulting and operating surgeon.

Bell, JOHN, an American statesman, born near Nashville, Tennessee, in 1797; died at Cumberland in 1869. Admitted to the bar in 1816, he was elected to Congress in 1827 and re-elected for six later terms. He left the Democratic and joined the Whig party about 1833, and was elected speaker of the House by that party in 1834, made Secretary of War

under President Harrison, and served as United States Senator from Tennessee 1847-59; he was nominated for President by the Constitutional Union party in 1860, receiving the electoral votes of three states.

Bell, JOHN, an English sculptor, born at Norfolk in 1811. His best-known works are the *Eagle Slayer*, *The Maid of Saragoosa*, *Andromeda*, statues of Lord Falkland, Sir Robert Walpole, Newton, Cromwell, and others, and the Wellington Memorial in Guildhall. He is also one of the sculptors of the Guards Monument in Waterloo Place, London, and the Prince Consort Memorial in Hyde Park. He died in 1895.

Bell, ROBERT, journalist and miscellaneous writer, born at Cork in 1800; died at London in 1867. He settled in London in 1828, edited the *Atlas* for several years, and afterwards the *Monthly Chronicle*, *Mirror* and *Home News*. He compiled several volumes of Lardner's *Cabinet Cyclopaedia*; but he is best known by his annotated edition of the *British Poets*, the first volume of which appeared in 1854, and which was carried through twenty-nine volumes. He also wrote several plays and novels.

Bell, THOMAS, an English zoologist, born at Poole, Dorset, in 1792; died at Selborne, Hampshire, in 1880. He became a member of the Royal College of Surgeons in 1815, and soon secured a large practice as a dentist. In 1836 he was appointed professor of zoology in King's College, London. His best-known separate works are his histories of British quadrupeds, British reptiles, and British stalk-eyed crustacea, published in the years 1853. In 1877 he published an excellent edition of *White's Natural History of Selborne*.

Bella, STEFANO DELLA, an engraver, born at Florence in 1610; died in 1664. In 1642 he went to Paris, where he was employed by Cardinal Richelieu. He returned to Florence and became the teacher in drawing of Cosmo de Medici.

Belladonna (bel-a-don'a), a European plant, *Atropa belladonna*, or deadly nightshade, nat. order *Solanaceae*. Cultivated in United States. All parts of the plant are poisonous, and the incautious eating of the berries has often produced death. The spissated juice is commonly known by the name of extract of belladonna. It yields several alkaloids, the most important among them being atropine, much used in medical practice. It has the property causing the pupil of the eye to dilate.

Belladonna Lily, so called on account of its beauty, a species of *Amaryllis* (*belladonna*) with delicate bluish

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Bellaire

flowers clustered at the top of a leafless flowering stem. It is a native of the Cape of Good Hope and of the West Indies.

Bellaire (bel-är'), a city of Belmont Co., Ohio, on the Ohio River, 4 miles below Wheeling. Coal, limestone and fireclay abound, and there are manufactures of iron, steel, castings, stoves, glass, enamelled ware, brick, wood-work. Pop. (1910) 12,946.

Bellamy (bel'a-mi), EDWARD, novelist, was born at Chicopee Falls, Massachusetts, in 1850; died in 1898. His Socialistic novel, *Looking Backward*, had an extraordinary sale. It was followed by *Equality*, and he wrote several other works.

Bellamy (bel'a-mi), JACOBUS, a Flemish poet, was born at Flushing in the year 1757, and died in 1786. A volume of sentimental and anacreontic poems was published in 1782, and was followed in 1785 by a collection of his patriotic songs under the title *Vaderlandsche Gezangen*, which secured him a place among the first poets of his nation. He ranks as one of the restorers of modern Dutch poetry.

Bell-animalcule. See *Vorticella*.

Bellarmino (bel-lar-mé'nó), ROBERTO, or BELLARMINO, ROBERT, a cardinal and celebrated controversialist of the Roman Church, born at Monte Pulciano in Tuscany in 1542; died at Rome in 1621. He was ordained a priest in 1569 and immediately afterwards was placed in the theological chair of the University of Louvain. He was made a cardinal on account of his learning, by Clement VIII, and in 1602 created Archbishop of Capua. Paul V recalled him to Rome, on which he resigned his archbishopric without retaining any pension on it as he might have done. Bellarmino, whose life was a model of Christian asceticism, is one of the greatest theologians, particularly in polemics, that the Church of Rome has ever produced. He had the double merit with the court of Rome of supporting her temporal power and spiritual supremacy to the utmost, and of strenuously opposing the reformers. The talent he displayed in the latter controversy called forth all the similar ability on the Protestant side; and for a number of years no eminent divine among the reformers failed to make his arguments a particular subject of refutation. His principal work is *Disputationes de Controversiis Fidei adversus hujus Temporis Hæreticos*.

Bellary (bel-a'ri), a town in India, presidency of Madras, capital

Bellefonte

of a district of the same name, 280 miles northwest of Madras; a military station, with a fort crowning a lofty rock, and other fortifications. Pop. 58,247.—The district was ceded to the British in 1800. Area, 5714 square miles.

Bellay (bel-ä), JOACHIM DU, a distinguished French poet, known as the French Ovid; born about 1524; died in 1560. He joined Ronsard, Daurat, Jodelle, Belleau, Baif, and de Tisard in forming the 'Pleiad,' a society the object of which was to bring the French language on a level with the classical tongues. Bellay's first contribution was *La Défense et Illustration de la Langue Française*. His chief publications in verse are *Recueil de Poésie*; a collection of love-sonnets called *L'Olive*; *Les Antiquités de Rome*; *Les Regrets*; and *Les Jeux Rustiques*. For a short time he was canon of Notre Dame, but that he was made Archbishop of Bordeaux is highly improbable. Spenser translated some of his sonnets into English.

Bell-bird, the name given to the South American passerine bird, so named from its sonorous bell-like notes; and also to the *Myzantha melanophrys* of Australia, a bird of the family *Meliphagidae* (honey-suckers), whose notes also resemble the sound of a bell.

Bell, Book, and Candle, a solemn mode of excommunication used in the Roman Catholic Church. After the sentence was read, the book was closed, a lighted candle thrown to the ground, and a bell tolled as for one dead.

Bell-crank, in machinery, a rectangular lever by which the direction of motion is changed through an angle of 90°, and by which its velocity ratio and range may be altered at pleasure by making the arms of different lengths. It is much employed in machinery, and is named from its being the form of crank employed in house-bells.

Belleau (bel-ö), REMY, a French poet of the Renaissance, and member of the Pleiad (see *Bellay*); born 1528; died 1577. Chief work: *Commentaries on Ronsard's Amours*.

Bellefontaine (bel'fon-tän), a city county seat of Logan Co., Ohio, 50 miles N. W. of Columbus. Has bridge, car, locomotive, and other manufactures, and as a city owns all its public utilities—water, gas, electric light and sewage. Pop. (1912) 9640.

Bellefonte, borough, capital of Centre Co., Pennsylvania, 26 miles S. W. of Lockhaven. It contains a noted spring and is a summer resort. It

has large and varied manufactures and a good trade. Coal is mined in its vicinity. Pop. 4145.

Belle-Isle (bel-si), or **BELLE-ILE-EN-MER**, a French island in Bay of Biscay, dep. of Morbihan, 8 m. s. of Quiberon Point; length 11 m., greatest breadth 6 m. Pop. about 10,000, largely engaged in the pilchard fishing. The capital is Le Palais on the N. E. coast.

Belle-Isle (bel-il'), a rocky island, 9 m. long, at the eastern entrance to the Straits of Belle Isle, the channel, 15 m. wide, between Newfoundland and the coast of Labrador. Steamers from Glasgow and Liverpool to Quebec round the north of Ireland commonly go by this channel in summer as being the shortest route.

Belleisle (bel-si), **CHARLES LOUIS AUGUSTE FOUQUET**, DUO DE, Marshal of France, born in 1684; died in 1761. He distinguished himself during the war of the Spanish succession, afterwards in Spain and Germany, where, under Berwick, he took Treves and Trarbach, and had a distinguished share in the siege of Phillipsburg. The cession of Lorraine to France was principally his work. He was created marshal of France about 1740; commanded in Germany against the Imperialists, took Prague by assault; but the king of Prussia having made a separate peace, he was compelled to retreat, which he performed with admirable skill. In 1744 he was taken prisoner by the English, but was soon exchanged. In 1748 he was made a duke and peer of France, and the department of war was committed to his charge.

Bellenden, **JOHN**, flourished 1533-87. Scottish writer. Translated Boece's *Historia Scotorum*.

Bellenden, **WILLIAM**, a Scottish writer, distinguished for the elegance of his Latin style, born between 1550 and 1560, probably at Lasswade; died between 1631 and 1633. He was professor of belles-lettres at Paris.

Belleric (bel-er'ik), the astringent fruit of *Terminalia bellerica*. See *Myrobalan*.

Bellerophon (bel-ler'o-fon), or **HIPPONOUS**, in Greek mythology, a hero who, having accidentally killed his brother, fled to Proetus, King of Argos, whose wife, Antea, fell in love with him. Being slighted, she instigated her husband to send him to her father, Iobates, King of Lycia, with a letter urging him to put to death the insulter of his daughter. That king, not wishing to do so directly, imposed on him the dangerous task of conquering the Chimæra, which Bellerophon, mounted on Pegasus, a gift from Athena, overpowered. Iobates afterwards gave him his daughter

in marriage, and shared his kingdom with him. He attempted to soar to heaven on the winged horse Pegasus, but fell to the earth, where he wandered about blind, till he died.

Bellerophon, a large genus of fossil nautiloid shells, consisting of only one chamber, like the living Argonaut. They occur in the Silurian, Devonian, and Carboniferous strata.

Belles-Lettres (bel-let-r), polite elegant literature; word of somewhat vague significance. Rhetoric, poetry, fiction, history, and criticism, with the languages in which the standard works in these departments are written, are generally understood to come under the head of *belles-lettres*.

Belleville (bel'vil), a city and railroad center, county seat of St. Clair Co., Illinois, with important manufactures of iron and steel, etc., large smelting works, and with rich mines of bituminous coal in its vicinity. Population, largely German, 25,000.

Belleville, a manufacturing town, Essex Co., New Jersey, on the Passaic River and the Erie Railroad. Produces woven wire, hats, automobiles, tires, etc., and has oil works and other industries. Pop. (1910), 9891.

Belleville, a city of Canada, province of Ontario, capital of Hastings Co., on the Bay of Quinté, at the mouth of the Moira, with flourishing trade and manufactures. It has a Methodist Episcopal college. Pop. 9117.

Bellevue (bel'vu), a city of Canada, bell Co., Kentucky, adjacent to Newport, has manufactures of wagons, paper-boxes, etc. Pop. 6683.

Bellevue, a post city of Huron Co., Sandusky Cos., Ohio, 10 miles S. E. of Toledo. Has manufactures of paints, cultivators, flour, canning and packing. Pop. 5209.

Bellevue, a borough of Allegheny county, Pennsylvania, near Allegheny, of which it is a suburb. Pop. (1910) 6323.

Bell-flower, a common name for species of *Campanula* from the shape of the flower, which resembles a bell.

Bellingham, a city of Whatcom County, Washington, on Bellingham Bay, 125 miles N. of Seattle. Has very large fish-canning interests, trade in hops, coal, lumber, etc., and many large manufactories. Pop. 24,298.

Bellini (bel-si'né), **JACOPO**, and two sons, **GENTILE** and **CARLO VANNI**, the founders of the Venetian school of painting. The father excelled in portraits, but very little of his work extant. He died about 1470. Gentile born in 1427, and in 1479 went to C

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stantinople, Mohammed II having sent to Venice for a skillful painter; died at Venice in 1501. Giovanni was born after 1427, and died about 1516. He contributed much to make oil-painting popular, and has left many noteworthy pictures. Titian and Giorgione were among his pupils.

Bellini (bel-é'né), VINCENZO, a celebrated composer, born at Catania, Sicily, in 1801; died in 1835. He was educated at Naples under Zingarelli, commenced writing operas before he was twenty, and composed for the principal musical establishments in Europe. His most celebrated works are *I Montecchi e Capuleti* (1829); *La Sonnambula* (1831); *Norma*, his best and most popular opera; and *I Puritani* (1834).

Bellinzona (bel-in-zó'na), a town of Switzerland, capital of the canton Ticino; charmingly situated on the left bank of the Ticino about 5 miles from its embouchure in the N. end of Lago Maggiore. It occupies a position of great military importance. Pop. about 3600.

Bellis, the genus to which the daisy belongs.

Bellmann, KARL MIKAEL, the most original among the Swedish lyric poets, was born in 1740; died in 1795. His songs, in which love and liquor are common themes, are sung over the whole country, and 'Bellmann' societies hold an annual festival in his honor.

Bell-metal. See *Bell*.

Belloc (bel'lok), HILAIRE JOSEPH PETER, an English writer, illustrator and Liberal politician, born in 1870. He was educated at Balliol College, Oxford; was member of the House of Commons 1906-10. Among his writings are *The Bad Child's Book of Beasts*, *The Path to Rome*, *The Historic Thames*, *On Nothing*, *Esto Perpetua*.

Bellona (bel-ló'na), the goddess of war among the Romans, often confounded with Minerva. She was the sister of Mars, or, according to some, his daughter or his wife. She is described by the poets as armed with a bloody scourge, her hair disheveled, and a torch in her hand.

Belloc (bel-ó), JOSEPH RENÉ, a French naval officer, born at Paris in 1826; drowned in 1853. In 1851 he joined the expedition to the Polar regions in search of Sir John Franklin, and took part in several explorations. He was drowned in an attempt to carry despatches to Sir Edward Belcher over the ice. His diary was published in 1856.

Bellows (bel'lós), an instrument or machine for producing a

strong current of air, and principally used for blowing fires, either in private dwellings or in forges, furnaces, mines, etc. It is so formed as, by being dilated and contracted, to inhale air by an orifice which is opened and closed with a valve, and to propel it through a tube upon the fire. It is an ancient contrivance, being known in Egypt, India, and China many ages ago, while forms of it are used among the savage tribes in Africa.

Bellows, GEORGE WESLEY, an American artist, born at Columbus, O., in 1882. He has exhibited at various cities in Europe and the United States. His work is represented in collections at the Metropolitan Museum, New York, at the Pennsylvania Academy of the Fine Arts, Philadelphia, and in other American cities.

Bellows, HENRY WHITNEY, a Unitarian divine, born at Boston in 1814; died in 1882. Graduated at Harvard in 1832, afterwards studied theology, and became pastor of a New York church in 1838. He was an able and eloquent pulpit speaker and lecturer, was the principal founder of the *Christian Inquirer*, and author of *On the Treatment of Social Diseases*, etc. Organized and was president of the United States Sanitary Commission.

Bellows Falls, a post village of Vermont, on the Connecticut River. Has extensive manufactures of paper, farming implements, etc. Pop. 4883.

Bellows-fish, an acanthopterygious fish of the genus *Centriscus* (*C. scolopax*); called also the trumpet-fish or sea-snipe. It is not uncommon in the Mediterranean, but rare in the British seas.

Belloy (bel-wä), PIERRE LAURENT BUIRETTE DE, a French dramatist, born 1727; died 1775. His principal plays are *Zelmire*, a tragedy; *Le Siège de Calais*, which was immensely popular; *Gaston et Bayard*, which admitted him into the French Academy; and *Pierre le Cruel*. He was one of the first to introduce native heroes upon the stage.

Bell Rock, or INCH CAPE, a dangerous reef sumounted by a lighthouse, situated in the German Ocean about 12 miles from Arbroath, nearly opposite the mouth of the river Tay. It is said that in former ages the monks of Aberbrothock caused a bell to be fixed on this reef, which was rung by the waves, and warned the mariners of this highly dangerous place. Tradition also says that the bell was wantonly cut away by a pirate, and that a year after he perished on the rock himself with ship and plunder. Southey has a well-

known poem on this subject. The light-house was erected in 1808-11 by Robert Stevenson from Rennie's plan at a cost of upwards of \$300,000. It rises to a height of 120 feet.

Belluno (bel-lō'nō), a city of Northern Italy, capital of a province of the same name, on the Piave, 48 m. N. of Venice. Has an old cathedral, a handsome theatre, etc.; and manufactures of silk, straw-plait, leather, etc. Pop. 7014. The province has an area of 1271 sq. miles.

Belmont, **BATTLE AT**, an engagement during the Civil War, in which General U. S. Grant, under orders of General John C. Fremont, participated. The attack was directed against Columbus, across the river from Belmont, on the Mississippi. It resulted in victory for the Union troops, but they were compelled to withdraw, with a loss of 500 men.

Belodon (bel'ō-don), the typical genus of crocodiles, family *Belodontidae*, belonging to the Triassic age.

Beloe (bē'lo), **WILLIAM**, an English clergyman and miscellaneous writer, born 1756; died 1817. He was educated at Cambridge, and in 1803 became keeper of the printed books in the British Museum, a post he did not retain.

Beloit (bē-loit'), a city of Rock Co., Wisconsin, 69 miles southwest of Milwaukee, the seat of Beloit College. It has manufactures of agricultural implements, paper, pumps, engines, and other articles. Pop. 15,125.

Belomancy (bel'ō-man-si), a kind of divination by arrows, practised by the ancient Scythians and other nations. One of the numerous modes was as follows:—A number of arrows, being marked, were put into a bag or quiver, and drawn out at random; and the marks or words on the arrow drawn determined what was to happen. See Ezek. xxi, 21.

Belon (bē-lōn), **PIERRE**, French naturalist, born 1517; murdered by robbers 1564. His chief work was a *Natural History of Birds*, 1555.

Belot (bā-lō), **ADOLPHE**, a French novelist and dramatist, born in Guadeloupe 1829; died in Paris 1890. Among his works are *L'Article 47*, the play (in collaboration with Villetard) *Le testament de César Girodot*, etc.

Belpasso (bel-pās'so), a town of Sicily, on the southern slope of Mount Etna, in the province of Catania, and 8 miles from the town of that name. Pop. about 9640.

Belper (bel'per), a town, England, Derbyshire, in a valley, on the Derwent, 7 miles N. of Derby, with large cotton-mills, foundries, etc., and in the

neighborhood numerous collieries. P. (1911) 11,843.

Belshazzar (bel-shaz'ar), the last of the Babylonian kings who reigned conjointly with his father Nabonadius. He perished B.C. 538, during the successful storming of Babylon by Cyrus. This event is recorded in the book of Daniel; but it is difficult to bring the particulars there given into harmony with the cuneiform inscriptions as interpreted to-day.

Belt, **BELTING**, a flexible endless band or its material, used to transmit motion or power from one wheel, roller, or pulley to another, and comm-



Malleable Iron Link-Belt.

in various kinds of machinery. Driving belts are usually made of leather or India rubber, or some woven material, but ropes and chains are also used for the same purpose.

Belt, **THE GREAT and LITTLE**, two straits connecting the Baltic with the Cattegat, the former between the islands of Zealand and Funen, about 18 miles in average width; the latter between Funen and the coast of Schleswig, at its narrowest part not more than a mile in width.

Beltane (bel'tān; a Celtic name meaning 'fire of Bel'), a sort of festival formerly observed in Ireland and Scotland, and still kept up in a fashion in some remote parts. It is celebrated in Scotland on the first day of May (O.S.), usually by kindling fires on the hills and eminences. In early times it was compulsory on all to have their domestic fires extinguished before the Beltane fires were lighted, and it was customary to rekindle the former from the embers of the latter. This custom no doubt derived its origin from the worship of the sun.

Belton (bel'tun), the capital of Bell County, Texas, 55 miles northeast of Austin, the seat of the Baylor Female College and Belton Academy. Has manufactures of cotton, cotton seed oil, etc. Pop. 4161.

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Beluga (be-lŭ'ga) (*Beluga arctica* or *Delphinapterus leucas*), a kind of whale or dolphin, the white whale or white fish, found in the northern seas of both hemispheres. It is from 12 to 18 feet in length, and is pursued for its oil (classed as 'porpoise oil') and skin. In swimming the animal bends its tail under its body like a lobster, and thrusts itself along with the rapidity of an arrow. A variety of sturgeon (*Acipenser huso*) found in the Caspian and Black Sea is also called beluga.

Be'lus, the same as Bel or Baal, a divinity of the ancient Baby-
lonians. See *Babylonia*, *Babel*.

Belvedere (bel've-dĕr), in Italian arch. the uppermost story of a building open to the air, at least on one side, and frequently on all, for the purpose of obtaining a view of the country and for enjoying cool air. A portion of the Vatican in which are several important statues has this name.

Belvidere (bel-ve-dĕr'), a city of Illinois, county seat of Boone Co., 78 miles w. of Chicago; has manufactures of sewing machines, screw machine products, etc. Pop. (1910) 7253.

Belzoni (bel-zŏ'ni), GIOVANNI BATTISTA (John Baptist), an enterprising traveler, was born at Padua in 1778, and died near Benin 1823. In 1803 he emigrated to England, where, being endowed with an almost gigantic figure and commensurate strength, he for a time gained his living as an athlete. In 1815 he visited Egypt, where he made a hydraulic machine for Mehemet Ali. He then devoted himself to the exploration of the antiquities of the country, being supplied with funds by Mr. Salt, the British consul-general. He succeeded in transporting the bust of Memnon (Rameses II) from Thebes to Alexandria, whence it was sent to the British Museum; explored the great temple of Rameses II at Abu-Simbel; opened the tomb of Seti I, from which he obtained the splendid alabaster sarcophagus bought by Sir John Soane for \$10,000; and also succeeded in opening the second (King Chephren's) of the pyramids of Ghizeh. He afterwards visited the coasts of the Red Sea, the city of Berenice, Lake Mœris, the Lesser Oasis, etc. The narrative of his discoveries and excavations in Egypt and Nubia was received with general approbation. He died during a projected journey to Timbuctoo.

Bem, JOSEPH, a Polish general, born at Tarnow, in Galicia, in 1795; died at Aleppo in 1850. His first service

was in the French expedition against Russia in 1812. He served in the Polish army in the revolution of 1830, after which he resided in Paris. In 1848 he joined the Hungarian army, and in the following year obtained several successes against the Austrians and Russians; but after the defeat at Temosvar he retired into Turkey, where he embraced Moham-
medanism and was made a pasha.

Bembecidæ (bem-bes'i-dĕ), a family of wasp-like hymenopterous insects with stings, mostly natives of warm countries, and known also as sand-wasps. The female excavates cells in the sand, in which she deposits, together with her eggs, various larvae or perfect insects stung into insensibility, as support for her progeny when hatched. They are very active, fond of the nectar of flowers, and delight in sunshine. *Bembex* is the typical genus of this family.

Bem'bo, PIETRO, a celebrated Italian scholar, born at Venice in 1470; died in 1547. At Venice he became one of a famous society of scholars which had been established in the house of the printer Aldus Manutius. In 1512 he became secretary to Leo X, after whose death he retired to Padua. He was next appointed historiographer to the Republic of Venice, and librarian of the library of St. Mark. Pope Paul III conferred on him, in 1539, the hat of a cardinal, and soon after the bishoprics of Gubbio and Bergamo. The most important of his works are: *History of Venice* from 1487 to 1513, written both in Latin and Italian; prose dialogues in which the rules of the Italian language are laid down; *Gli Asolani*, dialogues on the nature of love; and *Le Rime*, a collection of sonnets and canzonets.

Bem'bridge Beds, in geology, a fossiliferous division of the Upper Eocene strata, principally developed at Bembridge in the Isle of Wight, consisting of marls and clays resting on a compact, pale-yellow or cream-colored limestone, called Bembridge limestone. Their most distinctive feature is the mammalian remains of the *Palæotherium* and *Anoplotherium*.

Bemidji (bĕ-mid'je), a city, capital of Beltrami Co., Minnesota, about 166 miles w. n. w. of Duluth. Lumber and farming interests. Pop. 5099.

Bemis Heights, BATTLE OF. See *Saratoga*, *Battle of*.

Ben (Hebrew, 'son'), a prepositive syllable signifying in composition 'son of,' found in many Jewish names, as *Bendavid*, *Benasser*, etc.

Ben, a Gaelic word signifying moun-
tain, prefixed to the names of

many mountains in Scotland north of the Firths of Clyde and Forth; as, *Ben Nevis*, *Ben MacDhul*, etc.

Ben, OIL of, the expressed oil of the ben-nut, the seed of *Moringa pterygosperma*, the ben or horse-radish tree of India. The oil is inodorous, does not become rancid for many years, and is used by perfumers and watchmakers.

Benares (be-nā'rez; in Sanskrit, *Vārāṇasī*), a town in Hindustan, Northwest Provinces, administrative headquarters of a district and division of the same name, on the left bank of the Ganges, from which it rises like an amphitheater, presenting a splendid panorama of temples, mosques, palaces, and other buildings with their domes, minarets, etc. Fine ghats lead down to the river. It is one of the most sacred places of pilgrimage in all India, being the headquarters of the Hindu religion. The principal temple is dedicated to Siva, whose sacred symbol it contains. It is also the seat of government and other colleges, and of the missions of various societies. Benares carries on a large trade in the produce of the district and in English goods, and manufactures silks, shawls, embroidered cloth, jewelry, etc. The population, including the neighboring cantonments at Sikraul (Secrole), is estimated at 203,100.

Benbec'ula, an island of Scotland in the Outer Hebrides, between North and South Uist, about 8 miles in diameter, low, flat, and infertile, with many lakelets and inlets of the sea.

Benbow, JOHN, an English admiral born in Shrewsbury in 1653; died 1702. For his skill and valor in an action with a Barbary pirate he was promoted by James II to the command of a ship of war. William III employed him in protecting the English trade in the Channel, which he did with great effect, and he was soon promoted to the rank of rear-admiral. In 1701 he sailed to the West Indies with a small fleet, and in August of the following year he fell in with the French fleet under Du Casse, and in the heat of the action a chain-shot carried away one of his legs. At this critical instant, being most disgracefully abandoned by several of the captains under his command, the whole fleet effected its escape. Benbow, on his return to Jamaica, brought the delinquents to a court-martial, by which two of them were condemned to be shot. He himself died of his wounds.

Bench, the dais or elevated part of a court-room where the judges sit. Hence the persons who sit as judges. The *King's* or *Queen's Bench*, in Eng-

land, was formerly a court in which originally the sovereign sat in person, which accompanied his household.

bench of bishops, or *Episcopal bench*, a collective designation of the bishops who have seats in the House of Lords.

Bencoolen (ben-kō'len; Dutch, *Bencoolen*), a seaport of Sumatra, on the s. w. coast. The Eng. settled here in 1685, and retained the place and its connected territory till 1824, when they were ceded to the Dutch in exchange for the settlements on the Malay Peninsula; since then Bencoolen greatly declined. Pop. 6870.

Bend, in heraldry, one of the nine bendable ordinaries, containing the third part of the field when charged and a fifth when plain, made by two lines drawn diagonally across the shield from the dexter chief to the sinister base point. The *bend sinister* differs only by crossing in the opposite direction, diagonally from the sinister chief to the dexter base point. It indicates illegitimacy.

Bender (ben'dér), a town and seaport of Russia, in Bessarabia, on the Dniester. Pop. 35,000.

Bender-Abbas, a seaport of South Persia opposite the island of Ormuz. Pop. about 6000.

Benedek (bā'ne-dék), LUDWIG VON, an Austrian general, born 1803, died 1881. Fought against the Italians in 1848, and afterwards against the Hungarian patriots. He distinguished himself at Solferino in the campaign of 1859; in the war with Prussia in 1866 he commanded the Austrian army till after Sadowa, when he was superseded.

Benedetti (ben-e-det'ti), VINCENT, a French diplomatist, born at Bastia, Corsica. He was ambassador at Turin in 1861, and at Berlin in 1864. He drew up the draft of a secret treaty between France and Prussia in 1870; and it was he who made at Ems the demand about the Hohenzollern candidature that led to the war. In *Ma Mission en Prusse* (1871) and *Studies in Diplomacy* (Eng. trans. 1895) he defends his own policy and throws all blame on Bismarck.

Benedict (ben-e-dikt), the name of fifteen popes, the first of whom succeeded to the papal chair on the death of John XII in 574. The first deserving of notice is Benedict I, who succeeded John XIX in 1033, being placed on the papal throne as a boy twelve years. His licentiousness caused him to be ignominiously expelled by the citizens, who elected Sylvester III. 8

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months after he regained the ascendancy, and excommunicated Sylvester; but finding the general detestation too strong to permit him to resume his chair, sold it to John Gratianus, who assumed the title of Gregory VI. There was thus a trio of popes, and the emperor, Henry III, to put an end to the scandal, deposed all the three. He died in 1054.—**BENEDICT XIII**, a learned and well-disposed man, originally Cardinal Orsini and Archbishop of Benevento, became pope in 1724. He bestowed his confidence on Cardinal Coscia, who was unworthy of it, and abused it in gratifying his avarice. He died in 1730, and was succeeded by Clement XII.—**BENEDICT XIV**, PROSPERO LAMBERTINI, born at Bologna in 1675, died 1758, a man of superior talents, passionately fond of learning, of historical researches, and monuments of art. Benedict XIII made him, in 1727, bishop of Ancona; in 1728 cardinal, and in 1732 Archbishop of Bologna. In every station he fulfilled his duties with the most conscientious zeal. He succeeded Clement XII in 1740, and showed himself a liberal patron of literature and science. He was the author of several esteemed religious works.—**BENEDICT XV**, Giacomo della Chiesa, born in 1854 near Genoa, of a family of the Italian nobility and was ordained a priest in 1878. In May, 1914, he was made a cardinal and succeeded Pius X as pope in September. In 1917 he offered a plan intended to bring about peace between the warring nations of Europe, but it was not accepted.

Benedict, ST., the founder of the first religious order in the West; born at Nursia, in the province of Umbria, Italy, A.D. 480, died 543. In early youth he renounced the world and passed some years in solitude, acquiring a great reputation for sanctity. Being chosen head of a monastery, his strictness proved too great for the monks, and he was forced to leave. The rule for monks, which he afterwards drew up, was first introduced into the monastery on Monte Cassino, in the neighborhood of Naples, founded by him. His *Regula Monachorum*, in which he aimed, among other things, at repressing the irregular lives of the wandering monks, gradually became the rule of all the western monks. Under his rule the monks, in addition to the work of God (as he called prayer and the reading of religious writings), were employed in manual labor, in the instruction of the young, and in copying manuscripts, thus preserving many literary remains of antiquity. See *Benedictines*.

Benedict, SIR JULIUS, pianist and composer, born at Stuttgart

1804, died at London 1885. He took up his residence in England in 1835, and was knighted in 1871. The operas that are best remembered are *The Gypsy's Warning*, *Undine*, *St. Cecilia*, *Lily of Killarney*, and *Grasiella*.

Benedict Biscop, an Anglo-Saxon monk, born of a noble Northumbrian family in 628 or 629; died at Wearmouth monastery in 690. In 674 he founded a monastery at the mouth of the Wear, and endowed it with numerous books, pictures, and relics obtained by him on various journeys which he made to Rome. He founded, in 682, a second monastery at Jarrow, dependent on that of Wearmouth. His great pupil the 'Venerable Bede,' who was a monk in the monastery of Jarrow, and who wrote his life, was undoubtedly much indebted to the collections made by Benedict for the learning he acquired.

Benedictine (ben-e-dik'tin), a liqueur prepared by the Benedictine monks of the abbey of Fécamp, in Normandy.

Benedictines, members of the most spread of all the orders of monks, founded at Monte Cassino, about half-way between Rome and Naples, c. 529, by St. Benedict. No religious order has been so remarkable for extent, wealth and men of note and learning as the Benedictines. Among the branches of the order the chief were the Cluniacs, founded in 910 at



Benedictine Monk.

Clugny in Burgundy; the Cistercians, founded in 1098, and reformed by St. Bernard in 1116; and in the 13th and 14th centuries, The Silvestrines, Celestines and Olivetans. The order was introduced into England about 600 by St.

Augustine of Canterbury, and a great many abbeys were established in different parts of the kingdom. To the Benedictines the name of *Black Monks* was applied, because of the uniformly black color of their habit, which consisted of a loose gown with large wide sleeves, and a cowl on the head ending in a point. The Benedictines produced many valuable literary works. The fraternity of St. Maur, founded in 1621, had in the beginning of the 18th century fully 180 abbeys and priories in France, and acquired by means of its learned members, such as Mabillon, Montfaucon, and Martène, merited distinction. They published the celebrated chronological work *L'Art de Verifier les Dates*, and edited many ancient authors.

Benefice (ben'e-fis), an ecclesiastical living; a church endowed with a revenue for the maintenance of divine service. Vicarages, rectories, perpetual curacies, and chaplaincies are termed benefices, in contradistinction to dignities, such as bishoprics, etc.

Benefit of Clergy was a privilege by which formerly in England the clergy accused of capital offenses were exempted from the jurisdiction of the lay tribunals, and left to be dealt with by their bishop. Though originally it was intended to apply only to the clergy or clerks, later every one who could read was considered to be a clerk, and the result of pleading 'his clergy' was tantamount to acquittal. A layman could only receive the benefit of clergy once, however, but he was not allowed to go without being branded on the thumb, a punishment which later might be commuted for whipping, imprisonment, or transportation. Abolished in 1827.

Benefit Societies. See *Building Societies* and *Friendly Societies*.

Beneke (ben'e-ke), FRIEDRICH EDUARD, a German philosophical writer, born in 1798; died in 1854. He began lecturing at Berlin, but his lectures were at first interdicted on account of their supposed materialistic tendency, and he removed to Göttingen. He returned to Berlin in 1827, and after the death of Hegel, whose philosophical views he opposed, he was appointed extraordinary professor of philosophy. His more important works are *Psychological Sketches*, *Text-book of Psychology as a Natural Science*, *System of Logic*, *Treatise on Education*, *Groundwork of a Physio of Ethics*, written in direct antagonism to Kant's *Metaphysic of Ethics*, etc. He is supposed to have committed suicide.

Benevento (ben-ā-ven'tō), a city of Southern Italy, the see of

an archbishop, in a prov. of same name on a hill between the rivers Sabato and Calore, occupying the site of the ancient Beneventum, and largely built of ruins. Few cities have so many remains of antiquity, the most perfect being magnificent triumphal arch of Trajan built in 114. The cathedral is a building of about the 12th century in the Lombard Saracenic style. It was originally Samnite town called Maleventum, conquered by Rome in the 3d century B. C. Pop. 17,603. The prov. has an area 818 sq. miles, and a pop. 1901, of 250,504.

Benfey (ben'fi), THEODORE, a German Sanskrit scholar, born 1809; died in 1881; professor of Sanskrit and comparative philology at Göttingen. Among his works were a *Sanskrit Chrestomathy*, *Vollständige Grammatik der Sanskritsprache*, *Sanskrit-English Dictionary*, etc.

Bengal (ben-gal'), a name given to part of British India:—(1) the old presidency, which prior to the mutiny embraced the larger portion of northern India; (2) the modern military division corresponding in extent to the above; (3) the province up to the division of 1905, which comprised Bengal proper, Behar, Orissa and Chota Nagpore; (4) Bengal as divided in 1905 from East Bengal and Assam. The present day Bengal has an area of 115,800 sq. miles, and 51,000,000 inhabitants; East Bengal and Assam, 106,130 sq. miles and a population of 31,000,000. In Bengal there are 42,000,000 Hindus and 9,000,000 Mohammedans; in East Bengal and Assam 12,000,000 Hindus and 18,000,000 Mohammedans.

The original territory of Bengal consists mainly of plains, there being throughout its extent few remarkable elevations, though it is surrounded with lofty mountains. It is intersected in all directions by rivers, mostly tributaries of its two great rivers the Ganges and Brahmaputra, which annually, in June and July, inundate a large part of the region. These annual inundations render the soil extremely fertile, but in those tracts where this advantage is not enjoyed the soil is thin, seldom exceeding a few inches in depth. The *Sundarbans* or *Sunderbunds* (from being covered with the sunder tree), that portion of the country through which the numerous branches of the Ganges seek the sea, about 150 miles from E. to W. and about 160 from N. to S., is traversed in all directions by water-courses, and interspersed with numerous sheets of stagnant water. The country is subject to great extremes of heat, which, added to the humidity of its surface, renders it generally unhealthy to

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Europeans. The seasons are distinguished by the terms hot (March to June), rainy (June to October), and cold (the remainder of the year). The most unhealthy period is the latter part of the rainy season. The heaviest rainfall occurs in Eastern Bengal, the annual average amounting to over 100 inches, an amount greatly exceeded in certain localities. Besides rice and other grains, which form along with fruits the principal food of the population, there may be noted among the agricultural products indigo, opium, cane-sugar, tobacco, betel, cotton, and the jute and sunn plants. Tea is now extensively grown in some places, notably in Darjeeling district and Chittagong. Cinchona is cultivated in Darjeeling and Sikkim. The forests cover 12,000 sq. miles, the principal forest trees being the sal on the Himalaya slopes, sal and teak in Orissa. Wild animals are most numerous in the Sundarbans and Orissa, snakes being remarkably abundant in the latter district. They include the elephant, rhinoceros, tiger, panther, antelopes, deer, buffalo, wild oxen, apes, and poisonous serpents which cause great havoc. The principal minerals are coal, iron, and salt. Coal is worked at Raniganj, in Bardwan district, where the seams are about 8 feet in thickness, and iron in the district of Birbhūm, in the same division. Salt is obtained from the maritime districts of Orissa. The principal manufactures are cotton piece-goods of various descriptions, jute fabrics, blanketing, and silks. Muslins of the most beautiful and delicate texture were formerly made at Dacca, but the manufacture is almost extinct. Sericulture is carried on more largely in Bengal than in any other part of India, and silk weaving is a leading industry in many of the districts. The commerce, both internal and external, is very large. The chief exports are opium, jute, indigo, oil-seeds, tea, hides and skins, and rice; the chief import is cotton piece-goods. The foreign trade is chiefly with Britain, China, the Straits Settlements, France, the United States, and Ceylon. Internal communication is rendered easy by a very complete railway and canal system, while the boat trade on the rivers is, for magnitude and variety, quite unique in India. The administration of Bengal is in the hands of a lieutenant-governor who is assisted by a number of secretaries. There is a board of revenue consisting of two members. For legislative purposes the lieutenant-governor has a council of twenty members. The army as reconstituted in 1904 consists of the Eastern Army corps, which includes all the troops from Meerut to Assam. Elementary education is given in the pri-

mary schools that have been developed out of the native schools, and are now connected with government. There are also a number of secondary and superior schools established by government, including eight government colleges. The highest educational institution is the Calcutta University, the chief function of which is to examine and confer degrees. The population of Bengal is largely rural. In 1912 Eastern Bengal was reunited with the old province and Bengal was raised to the rank of a presidency, under a governor. The reconstituted province has an area of about 70,000 square miles and a population of about 46,000,000.

The first of the East India Company's settlements in Bengal were made early in the seventeenth century. The rise of Calcutta dates from the end of the same century. The greater part of Bengal came into the hands of the East India Company in consequence of Clive's victory at Plassy in 1757, and was formally ceded to the company by the Nabob of Bengal in 1765. Chittagong had previously been ceded by the same prince, but its government under British administration was not organized till 1824. Orissa came into British hands in 1803. In 1858 the country passed to the crown, and since then the history of Bengal has been, on the whole, one of steady and peaceful progress.

Bengal, BAY OF, that portion of the Indian Ocean which lies between Hindustan and Farther India, or Burmah, Siam, and Malacca, and may be regarded as extending south to Ceylon and Sumatra. It receives the Ganges, Brahmaputra, and Irrawaddy. Calcutta, Rangoon, and Madras are the most important towns on or near its coasts.

Bengali (ben-gā'le), one of the vernacular languages of India, spoken by about 50,000,000 people in Bengal, akin to Sanskrit and written in characters that are evidently modified from the Devanāgarī (Sanskrit). Its use as a literary language began in the fourteenth century with poetry. Large numbers of Bengali books are now published, as also newspapers. A large number of words are borrowed from Sanskrit literature.

Bengal Light, a kind of firework often used for signaling by night at sea, producing a steady, vivid blue-colored flame.

Ben-gazi (ben-gā'zē), a town of N. Africa, in Barca, on the Gulf of Sidra, the most important seaport of the country, though the harbor admits only small vessels. Pop. about 15,000.

Bengel (beng'l), JOHANN ALBRECHT, a German theologian, born in 1687; died in 1752. He rendered good service by his criticism of the text of the New Testament, and his *Gnomon Novi Testamenti* has passed through many editions, and is still of value.

Benguela (ben-gā'la), a district belonging to the Portuguese on the w. coast of South Africa; bounded N. by Loanda, s. by Mossamedes, and w. by the Atlantic; area, perhaps 150,000 sq. m. The country is mountainous in the interior, and thickly intersected by rivers and streams. Its vegetation is luxuriant, including every description of tropical produce, and animal life is equally abundant. Copper, silver, iron, salt, sulphur, petroleum, and other minerals are found. The natives are mostly rude and barbarous. The capital, also called Benguela, or San Felipe de Benguela, is situated on the coast, on a bay of the Atlantic, in a charming but very unhealthy valley. It was founded by the Portuguese in 1617, and was formerly an important center of the slave trade, but has now only a spasmodic trade in ivory, wax, gum copal, etc. Pop. about 2,000.

Beni (bā'nē), a river of South America, state of Bolivia. It rises in the eastern slopes of the Andes, and after a course of 900 miles joins the Mamore to form the Madeira, which flows into the Amazon near Serpa.

Benicarlo (bā-nē-kār-lō'), a Spanish town on the Mediterranean, province of Castellon; the place of export of well-known red wines sent to Bordeaux to be mixed with clarets, or to England to be manufactured into port. Pop. 7251.

Beni-Hassan (bā'nē-has'san), a village of Middle Egypt, on the east bank of the Nile, remarkable for the grottoes or catacombs in the neighborhood, supposed to have formed a necropolis for the chief families of a city, Hermopolis, on the opposite bank, which exhibits interesting paintings etc.

Beni-Israel (bā'nē-is'ra-el), a race in the west of India (the Konkan sea-board, Bombay, etc.) who keep a tradition of Jewish origin, and whose religion is a modified Judaism; supposed to be a remnant of the ten tribes.

Benin (ben-ēm'), a negro country and former kingdom of West Africa, on the Bight of Benin, extending along the coast on both sides of the Benin River, west of the lower Niger, and to some distance inland. The chief town is Benin (pop. 15,000), situated on the river Benin, one of the outlets of the Niger,

about 50 miles from the ocean. The country is well wooded and watered, and in vegetable productions. Cotton is indigenous, and sugar-cane, rice, yams, etc. are grown.

Benin, BIGHT OF, part of the Gulf of Guinea, W. Africa.

Beni-Suef (ben'e-swef), the capital of a province of the name in Middle Egypt, situated on the left bank of the Nile. It has cotton and alabaster quarries, and an important annual market. Pop. 25,000.

Benitier (bā-nēt'yā), a stone for a vase for containing water, usually placed in a niche in the chief porch or entrance of a Roman Catholic church.

Benjamin (ben'jā-min), JUDAH the brains of the 'federacy,' born at St. Croix, W. I. 1811; died at Paris, 1884; studied law in New Orleans; elected U. S. Senator Louisiana in 1852; became a member of the cabinet of the Confederate States government as Secretary of War and in 1862 as Secretary of State.

Benlomond (ben-lō'mond), a mountain of Scotland in Perthshire, on the E. shore of Loch Lomond, rising to a height of 3192 feet, giving a magnificent prospect of the country of Stirlingshire, the Lothians, the Orkneys, etc.

Benne (ben'e), OIL, a valuable oil pressed from the seeds of *Sesadum orientale* and *S. indicum*, cultivated in India, Egypt, etc., and used for similar purposes with olive-oil.

Bennett, ARNOLD, an English journalist and author, born in Staffordshire, May 27, 1867. His writings have gained wide popularity, especially his novels, which include *A Journey from the North* (1898), *Anna of the Towns* (1902), *Buried Alive* (1903), *Old Wives' Tale* (1908), *Clayhanger* (1910), *The Old Adam* (1913), etc.

Ben'nett, JAMES GORDON, an American journalist, born in Banffshire, Scotland, in 1796, and emigrated to Nova Scotia, in 1819 as a teacher, and went thence to Boston as a printer. In 1822 he went to New York, and, after being connected with various papers, started the *New York Herald* in 1835. He died June 1, 1872.

Bennett, JAMES GORDON, JR., son of the above, born in 1835, proprietor of *New York Herald*; at father's death he projected Stanley's expedition to Africa in search of Dr. David Livingstone—also projected Jeannette polar expedition and was associated with Mackay in the Commercial Cable Company. Died May 14, 1918.

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Bennett, WILLIAM STERNDALE, an English composer, born in 1816 at Sheffield, where his father was organist; became pupil of the Royal Academy in 1826, and studied in Leipzig from 1836 to 1838. He is best known by his overtures, the *Naiads* and *Parisina*; his cantatas, the *May Queen* and *Women of Samaria*; and his little musical sketches, *Lake, Millstream* and *Fountain*. He died in 1875.

Ben-Nevis (nev'is), the most lofty mountain in Britain, in Inverness-shire, Scotland, south of the river and Glen of Spean. It rises to the height of 4406 feet, and in clear weather yields an extensive prospect.

Bennigsen (ben'ig-sen), LEVIN AUGUSTUS, COUNT VON (1745-1826), a Russian general, born at Brunswick. After some years in the Hanoverian service he entered that of Russia, 1773, distinguished himself in Turkey and Poland, took part in the conspiracy against Paul I, and was made general by Alexander I. In the war with France, 1805-13, he played a most distinguished part, especially at the battles of Pultusk, Eylau, Borodino, Tarutino, and Leipzig.

Bennington (ben'ing-ton), a town-ship of Vermont, noted as a manufacturing center for hosiery, shirts and collars. It was settled in 1761 and was the home of Seth Warner and Ethan Allen. Here was fought the battle of Bennington (q. v.). Pop. 8698.

Bennington, BATTLE OF, one of the battles of the American Revolution, fought near Bennington, Vt., between the forces of Burgoyne (q. v.), under General Baum (q. v.), and the Americans under General Stark (q. v.), August 16, 1777. Baum's expedition consisted of 800 men, comprising Hessians, Indians, some Canadians and British marksmen. Stark, with 2000 militia, attacked Baum and annihilated his forces, Baum himself being slain in the fight. Colonel Breyman appeared with 600 Hessians, which Burgoyne had sent, and Stark was joined by fresh troops under Seth Warner. The contest was renewed, but Breyman was defeated. The loss of the British was about 850; of the Americans about 70.

Benserade (bans-räd), ISAAC DE, a French poet of the court of Louis XIV, born in 1613; died in 1691. He wrote a paraphrase of *Job*, various tragedies and comedies, chiefly between 1635 and 1640, and a volume of rondeaux on Ovid's *Metamorphoses*, 1673.

Benson, ARTHUR CHRISTOPHER (1862-), an English essayist, poet and novelist, son of Edward

White Benson. His publications include: *The House of Quiet*, *The Hill of Trouble*, *The Child of the Dawn*, *Father Payne*, and many books of poems.

Benson, EDWARD FREDERICK (1867-), an English novelist, son of Edward White Benson, educated at Cambridge. After leaving college he went to Athens and worked there for the British Archaeological Society; afterwards in Egypt for the Hellenic Society. He traveled in Algiers, Egypt, Greece and Italy. In 1893 he published his first novel, *Dodo*, which was an instant success. Among the many other novels which he wrote may be mentioned *The Princess Sophia*, *Scarlet and Hyssop*, *The Challoners*, *The Angel of Pain*, *The Blotting Book*, *Mike*, *The Freaks of Mayfair*, *Mr. Teddy*, *Up and Down*, etc. His plays include *Jeannie* and *Dinner for Eight*.

Benson, EDWARD WHITE, one of the ablest of English prelates, born at Birmingham, 1829; died in 1896. He became bishop of Truro in 1877, and was consecrated archbishop of Canterbury in 1883.

Benson, MONSIGNOR ROBERT HUGH, an English Roman Catholic priest and author, son of Edward White Benson, born at Wellington College, November 18, 1871; died October 19, 1914. He was ordained a priest at Rome in 1904; appointed assistant priest at the church in Cambridge in 1905; and private chamberlain to Pius X, in 1911.

Benson, WILLIAM SHEPHERD, an American naval officer (1855-). He was born at Macon, Ga. He graduated from the U. S. Naval Academy in 1877, gained his captaincy in 1909 and became a rear-admiral in 1915. He served on various assignments at the Naval Academy and afloat. He was commandant of the Philadelphia Navy Yard from 1913 to 1915 and became Chief of Naval Operations on May 11, 1915. In November, 1917, Admiral Benson went abroad as the naval member of a commission sent by President Wilson to confer with the principal Allies.

Bent-grass, a name applied to various wiry grasses such as grow on commons and neglected ground and much used for lawns, including species of *Agrostis alba*, *Agrostis canina*, *Agropyron junceum*, etc.

Bentham (ben'tham), GEORGE, an English botanist, nephew of Jeremy Bentham, born in 1800; died in 1884. He published in French (1826) *The Plants of the Pyrenees and Lower Langue-doc*, and with Sir J. D. Hooker he produced the great work of descriptive botany, *Genera Plantarum*; another great

work of his was the *Flora Australiensis*. **Bentham** (ben'tham), JEREMY, a distinguished writer on politics and jurisprudence, born at London in 1748; educated at Westminster and Oxford; entered Lincoln's Inn, 1763. He was called to the bar, but did not practice, and, having private means, devoted himself to the reform of civil and criminal legislation. A criticism on a passage in Blackstone's *Commentaries*, published under the title *A Fragment on Government*, 1776, brought him into notice. Of his other works the more important were: *The Hard Labor Bill*, 1778; *Principles of Morals and Legislation*, 1789; *A Defense of Usury*, 1787; *Introduction to the Principles of Morals and Legislation*, 1789; *Discourses on Civil and Penal Legislation*, 1802; *Treatise on Judicial Evidence*, 1813, and *the Book of Fallacies*, 1824. His mind, though at once subtle and comprehensive, was characterized by something of the Coleridgean defect in respect of method and sense of proportion: and he is, therefore, seen at his best in works that underwent revision at the hands of his disciples. Of these M. Dumont, by his excellent French translations and rearrangements, secured for Bentham at an early date a European reputation and influence, and his editions are still the most satisfactory. In England James Mill, Romilly, John Stuart Mill, Burton, and others of independent genius, have been among his exponents. In ethics he must be regarded as the founder of modern utilitarianism; in polity and criminal law he anticipated or suggested many practical reforms; and his whole influence was stimulating and humanizing. He died in London, 6th June, 1832.

Benthos, the name given to the fixed organisms of ocean and deep lake waters, in distinction to plankton, or floating organic matter. It consists chiefly of algæ, usually attached to stones, thence called lithophytes. It is sparse above low water mark, on account of injurious exposure to atmospheric influences, but rich below this level; the green and brown sea-weeds predominating in the more shallow waters, the red at a greater depth; at great depths all plant life disappears.

Bentinck (ben'tink), LORD WILLIAM CAVENDISH. He was the second son of the third Duke of Portland, born in 1774. He served in Flanders, in Italy under Suwaroff, and in Egypt; was governor of Madras 1803-5; and commanded a brigade at Corunna. In 1810 he was British plenipotentiary and commander-in-chief of the troops in Sicily; and in 1813 headed an expedition into Catalonia. In 1814 he endeavored to

stimulate a revolt against the French in Italy. From 1829 to 1835 he was governor-general of India. He died in 1838. **Bentinck**, LORD WILLIAM GEORGE FREDERICK CAVENDISH, second son of the fourth Duke of Portland, born in 1802. He entered the army, but quitte it to become private secretary to Canning, and in 1827 entered Parliament. Up to 1846 he was a warm adherent of Sir Robert Peel; but in that year came forward as leader of the Protectionists in the House of Commons, abandoning the turn in which he had long reigned supreme. With the assistance of Disraeli he maintained this position for two years; and though often illogical, and sometimes unscrupulous in his statements, he nevertheless commanded much attention by the vigor and earnestness of his oratory and deportment. He died in 1848.

Bentley (bent'le), RICHARD, a great English classical scholar and critic, born near Wakefield, Yorkshire, in 1662. At the age of fourteen he entered St. John's College, Cambridge, where he took the degree of B.A. in 1680. In 1682 he became a master of Spalding School, and in the following year was appointed tutor to Dr. Stillingfleet's son. He lived in Dr. Stillingfleet's house during 1683-89, studying deeply, and accompanied his pupil to Oxford. In 1684 he took his M.A. degree at Cambridge, and in 1689 at Oxford, where two years later he won immediate reputation by the publication of his epistle to Mill on the Greek *Chronicle of Malalas*. Dr. Stillingfleet, having been raised to the bishopric of Worcester, made Bentley his chaplain, and in 1692 a prebendary in his cathedral. The same year he delivered the first series of the *Boyle Lectures*, his subject being a confutation of atheism. In 1694 he was appointed keeper of the royal library at St. James's Palace, and in 1696 came into residence there. Two or three years after began his famous controversy with the Hon. Charles Boyle, afterwards Earl of Orrery, relative to the genuineness of the Greek *Epistles of Phalaris*, an edition of which was published by Boyle, then a student at Christ Church, Oxford. In this dispute Bentley was completely victorious, though the greatest wits and critics of the age, including Pope, Swift, Garth, Atterbury, Aldrich, Dodwell and Conyers Middleton came to Boyle's assistance. Bentley's *Dissertation on the Epistles of Phalaris* appeared in 1699—'a monument of controversial genius'—'a storehouse of exact and penetrating erudition.' In 1700 he was presented to the mastership of Trinity College, Cambridge, and from this period until 1738 he was at feud with the fellows of that

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college. A lawsuit, which lasted more than twenty years, was decided against him, but his opponents were unable to carry out the sentence depriving him of his mastership. In 1711 he published an edition of Horace and in 1713 his remarks on Collins's *Discourse on Free-thinking*, by Phileleutherus Lipsiensis. He was appointed regius professor of divinity in 1716. In 1728 he published an edition of Terence and Phædrus. He meditated an edition of Homer, but left only notes. In Homeric criticism he has the merit of having detected the loss of the letter 'digamma' (which see) from the written texts. His last work was an edition of Milton's *Paradise Lost*, with conjectural emendations (1732). He died in 1742.

Benton (ben'tun), THOMAS HART, a statesman, born in or near Hillsborough, North Carolina, in 1782; died at Washington, in 1858. Studying law in Tennessee, he began practice at Nashville about 1811, and while serving as a soldier under General Jackson, in 1812, had a quarrel which led to a duel in which Jackson was severely wounded. He became editor of a political paper in St. Louis, 1815; was elected U. S. Senator from Missouri in 1820, and remained in the Senate until 1851. As such he supported Presidents Jackson and Van Buren, and opposed Calhoun on the subject of nullification. He was elected a member of the House in 1852 and opposed the repeal of the Missouri Compromise. In 1856 he was a candidate for the governorship of Missouri. He published a voluminous and valuable work entitled, *A Thirty Years' View, or a History of the Working of the American Government for Thirty Years*, also *An Abridgment of the Debates of Congress from 1789 to 1856*.

Ben'ton Harbor, a city of Berrien County, Michigan, near Lake Michigan, with canal connection. It is the shipping point of a great fruit region, and has important manufactures. There are numerous mineral springs in its vicinity. Pop. 9185.

Benué, or BINUÉ (ben'ü-ä, bin'ü-ä; 'mother of waters'), a river of Africa the greatest tributary of the Niger, which it enters from the east about 250 miles above its mouth. Dr. Barth came upon the river in 1851, and its course was partly traced by Dr. W. Balfour Baikie, but its source was only reached (by Flegel) in 1883. This lies near lat. 8° N. and lon. 14° E.

Benyowsky (ben-i-ov'ski), MAURICE AUGUSTUS, COUNT OF, born in Hungary in 1741; served in the Seven Years' war; and in 1769 was

made prisoner while fighting for the Polish Confederacy. Exiled to Kamchatka, he gained the affections of the governor's daughter, who assisted him to escape with his companions in 1771. They visited Japan, Macao, etc., and then went to France. The French government having requested him to form a colony in Madagascar he sailed thither, and was made king in 1776 by the native chiefs. He broke with the French government, sought private aid in England and America, sailed again to Madagascar in 1785, and was killed fighting against the French in 1786. His memoirs were published in 1790.

Benzerta. See *Bizerta*.

Benzene (ben'zën; C₆H₆), an aromatic liquid hydrocarbon, discovered in 1825 by Faraday, and obtained from coal-tar and petroleum. It may also be got by distilling 1 part of crystallized benzoic acid intimately mixed with 3 parts of slaked lime. It is thin, strongly refractive, and quite colorless, of a peculiar, ethereal, agreeable odor, and boils at 80° C. It is used by manufacturers of India rubber and gutta-percha on account of its great solvent powers, in the preparation of varnishes, and for cleaning gloves, removing grease-spots from woolen and other cloths, etc., on account of its power of dissolving fats and resins. It is highly inflammable and explosive, even the vapor catching fire if it comes in contact with a flame.

Benzoic Acid (ben-zō'ik; C₇H₅O₂), an organic acid obtained from benzoin and other resins and balsams, as those of Peru and Tolu, and benzene. It forms light, feathery, colorless needles; tastes pungent and bitterish; odor slightly aromatic. It is used for medicinal purposes.

Benzoic Ether, a colorless oily liquid, with a feeble aroma, mell and a pungent aromatic taste, lined by distilling together 4 parts alcohol, 2 of crystallized benzoic acid, and 1 of concentrated hydrochloric acid.

Benzoin (ben-zō-in, ben'zoin; Ar. luban jāwi, 'Javanese incense'), a solid, brittle, vegetable substance, the concrete resinous juice flowing from incisions in the stem or branches of the *Styrax benzoin*, a tree 70 or 80 feet high, nat. order Styracacæ. In commerce several varieties are distinguished, of which the yellow, the Siam, the amygdaloidal—the last containing whitish tears of an almond shape—and Sumatra firsts are the finest. It is imported from Siam, Singapore, Bombay, and occasionally from

Benzole

Calcutta; it is found also in South America. The pure benzoin consists of two principal substances, viz., a resin, and an acid termed *benzoic* (which see). It has little taste, but its smell is fragrant when rubbed or heated, and it is used as incense in the Greek and Roman Catholic



Benzoin Tree (*Styrax benzoin*).

churches. It is insoluble in water, but soluble in alcohol, in which form it is used as a cosmetic, a perfume, and in pharmacy. Benzoin may be produced by the contact of alkalies with the commercial oil of bitter almonds. It is also known as benjamin or gum benjamin.

Benzole (-zöl'). Same as *Benzene*.

Benzoline (ben'zō-lēn), a name of liquids of the same kind as benzene.

Beowulf (bē'ō-wulf), an Anglo-Saxon epic, the only existing MS. of which belongs to the eighth or ninth century, and is in the Cottonian Library (British Museum). From internal evidence it is concluded that the poem in its essentials existed prior to the Anglo-Saxon colonization of Britain, and that it must be regarded either as brought to Britain by the Teutonic invaders, or as an early Anglo-Saxon translation of a Danish legend. From the allusions in it to Christianity, however, it must have received considerable modifications from its original form. It recounts the adventures of the hero Beowulf, especially his delivery of the Danish kingdom from the monster Grendel and his equally formidable mother, and, finally, the slaughter by Beowulf of a fiery dragon, and his death from wounds received in the conflict. The character of the hero is attractive through its noble simplicity and disregard of self. The poem, which is the longest and most important in Anglo-Saxon literature, is in many points obscure, and the MS. is somewhat imperfect.

Béranger

Béranger (bā-rān-shā), **PIERRE J. DE**, a distinguished French lyric poet, born in Paris 1780. His father was a restless and scheming man; young Béranger, after witnessing the roof of his school the destruction of the Bastille, was placed under the charge of an aunt who kept a tavern at Peronne. At the age of fourteen he was apprenticed to a printer in Peronne, but was eventually summoned to Paris to assist his father in his financing and plotting. After many hardships he withdrew in disgust from that atmosphere of chicanery and intrigue in which he found himself involved, betook himself to a garret, and made many ambitious attempts in poetry and drama. Reduced to extremity, he applied in 1804 to Lucien Bonaparte for assistance, and succeeded in obtaining from him, first, a pension of 1000 francs, and five years later a university clerkship.



Béranger.

His songs, two collections of which had been published, offended the rulers; he was sentenced to three months' imprisonment and a fine of 500 francs. His third collection appeared in 1825, and in 1828 a fourth, which subjected him to a second state prosecution, an imprisonment of nine months, and a fine of 1000 francs. In 1833 he published his last collection, thereafter remaining silent till his death. Shortly after the revolution of February, 1848, he was elected representative of the department of the Seine in the constituent assembly, but sent in his resignation in the month of May of same year. He died at Paris on July 16, 1857. From first to last he kept in sympathetic touch with the French people in all their humors, social

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Berar (bā-rar'), otherwise known as the Hyderabad Assigned Districts, a commissionership of India, in the Deccan, area, 17,711 square miles, consisting chiefly of an elevated valley at the head of a chain of ghauts. It is watered by several affluents of the Godavari and by the Tapti, and has a fertile soil, producing some of the best cotton, millet, and wheat crops in India. The two principal towns of Berar are Amráoti (pop. 35,000) and Ellichpur (26,000). Coal and iron-ore are both found in the province, the pop. of which is 2,750,000. Berar was assigned by the Nizam to the British government in 1853 in security of arrears due. The old Kingdom of Berar was much more extensive.

Berat (ber-at'), a fortified town in the principality of Albania, situated about 30 miles northeast of the port of Avlona. It produces grain, oil and wine in abundance. Pop. 15,000.

Berber, a town on the right bank of the Nile, in the Egyptian Soudan, about 20 miles below the confluence of the Atbara, an important station for merchants on the route from Sennaar and Khartoum to Cairo, and also from Suakim. Pop. 10,000.

Berbera (ber-be-ra), the chief seaport and trading place of British Somaliland, East Africa, on a bay affording convenient anchorage in the Gulf of Aden. An important fair, which lasts for some months, is held here, increasing the population from 10,000 to about 30,000. It came into British possession in 1885.

Berberin (ber-be-rin), a golden-yellow coloring matter obtained from several species of *Berberis* or *barberry*.

Berberis (ber-be-ris), a genus of plants, type of the nat. order *Berberidaceæ* or *barberries*. See *Barberry*.

Berbers, a people spread over nearly the whole of Northern Africa, from whom the name *Barbary* is derived. The chief branches into which the Berbers are divided are, first, the Amazirgh or Amazigh, of Northern Morocco, though for the most part quite independent of the Sultan of Morocco, living partly under chieftains and hereditary princes and partly in small republican communities. Second, the Shuluh, Shiloh, or Shellakah, who inhabit the south of Morocco. They are more highly civilized than the Amazirgh. Third, the

Kabyles in Algeria and Tunis; and fourth, the Berbers of the Sahara, who inhabit the oases. Among the Sahara Berbers the most remarkable are the Beni-Mzâb and the Tuaregs. They are believed to represent the ancient Mauritians, Numidians, Gætulians, etc.

Berbice (ber-bēs'), a district of British Guiana watered by the river Berbice, and containing the town of Berbice or New Amsterdam, which has three churches and several public buildings.

Berchta (berk'hä; i. e., Bertha), in the folk-lore of S. Germany, a sort of female hobgoblin of whom naughty children are much afraid. Her name is connected with the word *bright*, and originally she was regarded as a goddess of benign influence.

Berchtesgaden (berk'hes-gä-dén), a town, Upper Bavaria, on the Achen or Alben in a beautiful situation, with a royal palace and villa, an ancient church, etc. There are important salt-mines in the neighborhood, and the people are also renowned for artistic carvings in wood. Pop. 10,046.

Berdiansk (bér-di-ansk'), a seaport of Southern Russia, gov. of Taurida, on the north shore of the Sea of Azof, with an important export and inland trade. Pop. 29,168.

Berdichef (bér-dē'chef; Pol. *Berdy-czew*), a city of European Russia, gov. of Kiev, with broad streets, well-built houses, numerous industrial establishments, and a very large trade, having largely attended fairs. Pop. 53,728, chiefly Jews.

Berea College, a coeducational institution in Kentucky on the edge of the Cumberland Mountains. In 1916 the students enrolled in the five departments numbered 1350.

Bereans (ber-ē'ans; or Barclayans, from their founder, Barclay), an insignificant sect of dissenters from the Church of Scotland, who profess to follow the ancient Bereans (see Acts, xvii, 10-13) in building their faith and practice upon the Scriptures alone, without regard to any human authority whatever.

Berengarius (be-ren-gā'ri-us) OF TOURS, born 998 at Tours, a teacher in the philosophical school in that city, and in 1040 Archdeacon of Angers; renowned for his philosophical acuteness as one of the scholastic writers, and also for the boldness with which, in 1050, he declared himself against the doctrine of transubstantiation, and for his consequent persecutions. He was several times compelled to recant, but always returned to the same opinions, until he

was compelled, in 1080, by the opposition of Lafranc, to retire to the Isle of St. Cosmas, near Tours, where he died in 1088. This Berengarius must not be confounded with Peter Berenger of Poitiers, who wrote a defense of his instructor Abelard.

Berenice (ber-e-ni'sē), 'bringer of victory', the name of several distinguished women of antiquity; in particular the wife of Ptolemy Euergetes, King of Egypt. When her husband went to war in Syria she made a vow to devote her beautiful hair to the gods if he returned safe. She accordingly hung it in the temple of Venus, from which it disappeared, and was said to have been transferred to the skies as the constellation *Coma Berenices*. Also the daughter of Agrippa I, King of Judah, 37-44 A.D. During the Roman occupation she is said to have won a promise of marriage from Titus, never fulfilled.

Berenice (ber-e-ni'sē), anciently a town on the Egyptian coast of the Red Sea, a place of great trade.

Berenson, BERNHARD, author and art critic, was born at Wilma, Russia, in 1865; came to the United States with his parents and was educated at the Boston Latin School and Harvard University. He graduated in 1887 and went to Italy to study Italian painting. He became an authority on the subject and contributed many articles to the art journals of Italy, Germany and France. Among his published works are: *Venetian Painters of the Renaissance*, *Lorenzo Lotto*, *Florentine Painters*, *Central Italian Painters*, *A Siennese Painter of the Francoiscan Legend*.

Beresford, ADMIRAL LORD CHARLES DE LA POER, British naval officer and parliamentarian, son of Rev. John, fourth Marquess of Waterford; born in the county of Waterford, Ireland, in 1846. He commanded the *Condor* which bombarded Alexandria in 1882, and following the bombardment he instituted a regular police system in Egypt. He served with Lord Wolseley on the Nile Expedition, 1884-85, and was in command of the naval brigade at Abu Klea, Abu Kru, and Metemmeh. He became rear-admiral of the Mediterranean fleet in 1900; commanded the Channel Squadron, 1903-05; was promoted to Admiral in 1906. From 1905 to 1909 he was commander-in-chief of the Mediterranean and Channel fleets. He retired in 1911. He served as Member of Parliament for Waterford from 1874 to 1880; East Marylebone, from 1885 to 1890; York, 1897 to 1900; Woolwich, 1902. In his book, *The Betrayal*, he was outspoken in condemnation of the shipbuilding policy

of Great Britain; it stirred up the government and led to the formation of the British Naval War Staff. Author of *Life of Nelson*, *The Break-up of China*, *The Betrayal*, etc. He died Sept. 7, 1910.

Beresford (ber'es-ford), WILLIAM CARR, VISCOUNT, a distinguished commander, a natural son of the first Marquis of Waterford; born in 1768. He entered the army, lost an eye in Nova Scotia, served at Toulon, and in Corsica, the West Indies, and Egypt. In 1806, a brigadier-general, he commanded the land force in the expedition to Buenos Ayres and in 1808 remodeled the Portuguese army, receiving in return the titles Marquis of Portugal, Duke of Elvas, and Marquis of Santo Campo. He was subsequently engaged at Badajoz, Salamanca, Vittoria, and Bayonne, and for his bravery at the battle of Toulouse was raised to the peerage with the title of Baron (Viscount, 1823) Beresford. He died in 1854.

Beretta. See *Biretta*.

Berezina (ber-es'i-na), BERESINA, tributary of the Dnieper in the Russian province of Minsk, rendered famous by the disastrous passage of the French army under Napoleon during the retreat from Moscow, Nov. 27-28, 1812.

Berezov (ber-yoz'ov), a town in Western Siberia, government of Tobolsk, on a branch of the Obi, the entrepôt of a large fur and skin district. Pop., chiefly Cossack, 1073.

Berg, an ancient duchy of Germany, on the Rhine. Now included in the governments Arnsberg, Cologne, and Düsseldorf.

Bergama (ber'gā-mā; ancient *Pergamus*), a town of Turkey, in Asia, north of Smyrna; contains the ruins of a Roman palace, etc. Pop. estimated from 6000 to 20,000.

Bergamo (ber'gā-mō), a town in North Italy, capital of the Province of Bergamo. Pop. 28,660. The comic characters in the Italian mask comedy are Bergamese, or affect the Bergamese dialect.

Bergamot (ber'gā-mot), a fruit-tree, a variety or species of the genus *Citrus*, variously classed with the orange, *Citrus aurantium*, the lime, *Citrus limetta*, or made a distinct species as *Citrus bergamia*. It is probably of Eastern origin, though now grown in Europe, and bears a pale-yellow pear-shaped fruit with a fragrant and slightly acid pulp. Its essential oil is in high esteem as a perfume.—*Bergamot* is also a name given to a number of different pears. The name is commonly used for

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the mint *Monarda fistulosa*, because of its odor.

Bergedorf (ber'gheh-dorf), a town in the territory of Hamburg, 10 miles E. S. E. of the city of Hamburg. Pop. 23,728.

Bergen (ber'gen), a seaport on the w. coast of Norway, the second town of the kingdom, about 25 miles from the open sea, on a bay of the Byfjord, which forms a safe harbor, shut in by hills which encircle the town on the land side, and promote perpetual rains. It has a very mild climate for its latitude. The town is well built, but has many narrow streets, and houses mostly of wood; with cathedral, museum, etc. The trade is large, timber, tar,



Bergen, from the Northwest.

train-oil, cod-liver oil, hides, and dried fish, being exported. Pop. 72,179.

Bergen-op-zoom (ber'gen-op-zōm), a town, Holland, in a marshy situation on the Scheldt, 20 miles N. N. W. of Antwerp. Pop. 13,668.

Berger, VICTOR L., first Socialist elected to Congress (1911), was born at Nieder Rebbuch, Austro-Hungary, 1860, emigrated to America, and after working at various trades became editor of a Socialist paper in Milwaukee. He was elected to the Sixty-second Congress (1911-13) from the Fifth Wisconsin district. Ran for Senator in 1918, but was defeated. He was arrested under the Espionage Act, charged with attempting to interfere with the operation of the Selective Draft Law in 1918.

Bergerac (bärzh-rák), a town of the department of the Dordogne, France. It gives its name to the

wine of the Dordogne district, sometimes termed in France *petit champagne*. Pop. 10,545.

Bergh (burg), HENRY, humanitarian, was born in New York in 1823. Becoming interested in the treatment of domestic animals, he succeeded, in 1866, in having incorporated the American Society for the Prevention of Cruelty to Animals. The humane work successfully carried on by Mr. Bergh soon enlisted the sympathies of women, and among his ablest assistants and most generous donors were ladies moving in the highest social circles in New York and elsewhere. He died in 1888.

Berghaus (berk'house), HEINRICH, a German geographer, born 1797, died 1884. He served in 1815 in the German army in France, and was from 1816 to 1821 employed in a trigonometrical survey of Prussia under the war department. From 1824 to 1855 he was professor of applied mathematics in the Berlin Academy of Architecture. Besides his various maps and his great *Physical Atlas*, he published *Allgemeine Länder- und Völkerkunde* (6 vols.), 1837-41; *Die Völker des Erdballs* (2 vols.), 1852; *Grundlinien der physikalischen*

Erdbeschreibung, 1856; *Grundlinien der Ethnographie*, 1856; *Deutschland seit hundert Jahren* (5 vols.), 1859-62; *Was man von der Erde Weiss* (4 vols.), 1856-60; *Sprachschatz der Sassen*, or Low German dictionary (left incomplete), etc.

Berghem (berk'hem), NICHOLAS, painter, born at Harlem in 1624, pupil of his father, Peter Klaas, and also of Van Goyen and the elder Weenix. He produced a large number of works, chiefly landscapes with cattle, of which eleven are in the Louvre, eighteen at St. Petersburg, etc. He died at Harlem, 1683. Dujardin was among his pupils.

Bergk (berk), THEODORE, a German classical scholar, born in 1812, died 1881. He was successively professor at Marburg, Freiburg, and Halle, and later resided at Bonn. He rendered most

service in the criticism and explanations of Greek lyric poetry.

Bergman (berk'mán), TORBERN OLOF, a Swedish physicist and chemist, born in 1735; died in 1784. He studied under Linnæus at Upsala; in 1758 became doctor of philosophy and professor of physics there; and in 1767 became professor of chemistry. He succeeded in the preparation of artificial mineral waters, discovered the sulphuretted hydrogen gas of mineral springs, and published a classification of minerals on the basis of their chemical character and crystalline forms. His theory of chemical affinities greatly influenced the subsequent development of chemistry.

Bergmehl (berg'mäl), mountain-meal or fossil farina, a geological deposit (fresh-water) in the form of an extremely fine powder, consisting almost entirely of the siliceous frustules or cell-walls of diatoms. It is a variety of diatomite (which see).

Bergson (berg'son), HENRI LOUIS, a French philosopher, born in Paris in 1859, and since 1900 professor of philosophy in the Collège de France. His writings, of which *Creative Evolution* is the most popular, are marked by great lucidity and richness of style. Bergson holds that the fulness of reality cannot be grasped by the intellect because the universe is continually changing, whereas concepts are fixed.

Bergylt (ber'gilt; *Sebastes marinus*), a name given in Shetland to the rose-fish, a fish of the family Scorpenidae, of a beautiful reddish color, sometimes found on the British coasts, and called Norway haddock and Norway carp.

Berhampur (bé-r-a-m-pur'), the name of two Indian towns: 1. A town and military station in the northeast portion of Madras presidency, the headquarters of Ganjam district, with a trade in sugar and manufactures of silks. Pop. about 25,000.—2. A municipal town and the administrative headquarters of Murshidabad district, Bengal; formerly a military station, and having still large barracks. It was the scene of the first overt act of mutiny in 1857. Pop. about 25,000.

Beriberi (ber'-i-ber-i), a disease endemic in parts of India, Ceylon, Japan, etc., characterized by paralysis, numbness, difficult breathing, and often other symptoms, attacking strangers as well as natives, and frequently fatal; thought to be due to eating of rice entirely rather than a mixed diet. It is now less frequent in Japan since rice is not the only food of the people.

Be'ring. See *Behring*.

Berkeley (berk'li), a town of Alameda Co., California, 10 miles N.E. of San Francisco, and on the bay. Here is the University of California and the Agricultural College; and the State institution for the deaf, dumb and blind. With the university, a fishing institution, is connected the Lick Observatory at Hamilton. It has large soap works and various other manufactures. Pop. 40,434.

Berkeley (berk'li), GEORGE, a famous metaphysical philosopher, celebrated for his ideal theory of philosophy. He was born in Ireland 1685 (his father being an officer of the army); became fellow of Trinity College, Dublin, in 1707; in 1721 was appointed chaplain to the Lord-lieutenant of Ireland, the Duke of Grafton. By a legacy from Miss Vanhomrigh (Swift's mistress) in 1723 his fortune was considerably increased. In 1724 he became bishop of Derry. He now published his *Proposals for the Conversion of the American Savages to Christianity by the Establishment of a College in the Bermudez Islands*; and subscriptions having been raised, he set sail for Rhode Island in 1728, proposing to wait there till a promised grant of £20,000 had been got from the government. The scheme never got started, however, and he returned, now receiving the bishopric of Cloyne. He suddenly died at Oxford in 1753. Berkeley holds an important place in the history of philosophy. He maintains that the belief in the existence of an exterior material world is false and inconsistent with itself, and those things which are called *sensory material objects* are not external to the mind, and are merely impressions made on our minds by the immediate act of God, according to certain *eternal laws of nature*, from which he never deviates; and that the steady adherence of the Supreme Spirit to his rules is what constitutes the reality of things to his creatures, and so effectually distinguishes the ideas perceived by him from such as are the work of the imagination itself or of dreams, that there is no danger of confounding them together. This hypothesis is more consistent than that of the *existence of matter*. Berkeley was admired as a writer; as a man he was said to have been possessed of 'a virtue under heaven.' His most celebrated philosophical works are: *Essays towards a New Theory of Vision*, 1709; *Treatise on the Principles of Human Knowledge*, 1710, in which his philosophical theory is fully set forth. Three

logues between Hylas and Philonous, 1713; *Alciphron, or the Minute Philosopher*, 1732; and *Siris, Philosophical Reflections and Inquiries concerning the Virtues of Tar-water*, 1744. There were others of a mathematical and theological order, the only complete edition being that of Fraser, 3 vols. 1871.

Berkeley, GEORGE CHARLES GRANTLEY FITZHARDINGE, a British author, sixth son of the fifth Earl of Berkeley, but second son after the legally recognized marriage; born in 1800. From 1832-52 he was Liberal member for West Gloucestershire. He became notorious in 1836 for his assault upon Fraser, the publisher, and his duel with Maginn for a hostile review in Fraser's Magazine of his first novel, *Berkeley Castle*. Besides other stories, poems, and works upon travel, sport, etc., he published in 1865-66 his *Life and Recollections* in 4 vols., and in 1867 a volume of reminiscences entitled *Anecdotes of the Upper Ten Thousand*—both of which gave rise to much discussion. He died in 1881.

Berkshire (bérk'shir), or BERKS, a county of England, between Oxfordshire, Buckinghamshire, Surrey, Hampshire, and Wiltshire, area 705 sq. miles, of which eight-tenths are cultivated or under timber. A range of chalk hills, entering from Oxfordshire, crosses Berkshire in a westerly direction. The western and central parts are the most productive in the county, which contains rich pasturage and excellent dairy farms, and is especially suited for barley and wheat crops. The Thames skirts the county on the north, and connects the towns of Abingdon, Wallingford, Reading, Henley, Maidenhead, and Windsor with the metropolis. Few manufactures are carried on, the principal being agricultural implements and artificial manures, flour, paper, sackings and sail-cloth, and biscuits (at Reading). Malt is made in great quantities. The minerals are unimportant. Pop. 195,814.

Berlad (bér'lad), a town of Rumania, on the Berlad, a navigable tributary of the Sereth. Has a large trade in maize. Pop. 24,484.

Berlengas (bér-lén'gas), a group of about twelve rocky islands, off the coast of Portugal.

Berlichingen (ber'li-king-en), GÖTZ or GODFREY VON, 'of the Iron Hand'; born at Jagsthausen, in Swabia, in 1480. He took part in various quarrels among the German princes; and having lost his right hand at the siege of Landshut, wore thereafter one made of iron. In constant feud with his baronial neighbors, and even with free cities like

Nuremberg, he at last headed the insurgents in the Peasants' War of 1525, and suffered imprisonment on their defeat. After the dissolution of the Swabian League he again fought against the Turks (1541) and the French (1544). He died in 1562. His autobiography, printed at Nuremberg in 1731, furnished Goethe with the subject for his drama, *Goetz von Berlichingen*.

Berlin (ber-lin'), capital of the Prussian dominions and of the German Empire and much the largest city in Germany, formerly in the province of Brandenburg, lies on a sandy plain on both sides of the Spree, a sluggish stream, here about 200 feet broad. It has water communication to the North Sea by the Spree, which flows into the Havel, a tributary of the Elbe, and to the Baltic by canals connecting with the Oder. The original portion of the city lies on the right bank of the river, and is irregularly built. The more modern portion is regular in its plan, and the streets are lined with lofty and well-built edifices mostly of handsome architectural design and constructed of solid materials. Of the numerous bridges, the finest is the Castle (Schloss) Bridge, 104 feet wide, and having eight piers surmounted by colossal groups of sculpture in marble. The principal and most frequented street, Unter den Linden ('under the trees'), is about a mile in length and 100 feet wide, the center being occupied by a double avenue of lime-trees. At the E. end of this street, and round the Lustgarten, a square with which it is connected by the Schloss Bridge, are clustered the principal public buildings of the city, such as the royal palace, the palace of the crown-prince, the arsenal, the university, the museums, royal academy, etc.; while at the W. end is the Brandenburg Gate, regarded as one of the finest portals in existence. Immediately beyond this gate is the Thiergarten (zoological garden), an extensive and well-wooded park containing the palace of Bellevue and places of public amusement. There are also several other public parks, and a zoological garden which ranks with the best in the world, also important natural history, ethnographical and other museums. The principal public buildings are the royal palace or Schloss, a vast rectangular pile, the museum (opposite the Schloss), a fine Grecian building, with an extensive collection of sculpture and painting; the royal theater is also a fine Grecian edifice. The royal library and palace of the emperor are united; the former contains above 1,000,000 volumes and 30,000 manuscripts and charts. The arsenal

(Zeughaus), besides arms and artillery, contains flags and other trophies of great antiquity. The university, the exchange, the Italian opera-house, the principal Jewish synagogue, the town-hall, and the old architectural academy are all beautiful structures. The town contains altogether about twenty-five theaters, thirty hospitals, sixteen barracks, ten or twelve cemeteries, etc. The prevailing style of the newer buildings, both public and pri-

reliefs, etc., are cast, together with a great variety of ornaments of unrivaled delicacy of workmanship. The older parts of the city were originally poor villages, and first rose to some importance under Markgraf Albert (1100-1170), not about two centuries ago Berlin was still a place of little consequence, the first important improvement being made by the great Elector Frederick William, who planted the Unter den Linden, and in



Berlin—Royal Theater and New Church in the Gendarmenmarkt.

vate, is Grecian, pure or Italianized. One of the most remarkable of modern monuments is that erected in 1851 to Frederick the Great in the Unter den Linden—the *chef-d'œuvre* of Rauch and his pupils. The literary institutions of the city are numerous and excellent; they include the university, having an educational staff of about 500 professors and teachers, and attended by nearly 8000 students and 7000 'hearers'; the academy of sciences; the academy of fine arts; and the technical high school or academy of architecture and industry (occupying a large new building in the suburb of Charlottenburg). The manufactures are various and extensive, including steam-engines and other machinery, brass-founding and various articles of metal, sewing-machines, paper, cigars, pottery and porcelain, pianos and harmoniums, artificial flowers, etc. In the royal iron-foundry busts, statues, bas-

whose time it already numbered 20,000 inhabitants. Under his successors Frederick I and Frederick the Great the city was rapidly enlarged and improved, the population increasing fivefold in the hundred years preceding the death of Frederick the Great and tenfold in the century succeeding it. The population within recent years has rapidly increased, and was estimated in 1910 at 2,064,153.

Berlin, CONGRESS OF. The preliminary treaty of San Stefano, concluded between Russia and Turkey after the war of 1877-78, was so greatly in favor of Russia that the remaining great Powers objected to its terms, and a congress was convened at Berlin in June, 1878, to consider and modify these terms. The Powers represented were Great Britain, France, Germany, Austria, Italy, Russia and Turkey.

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July 13, 1878, in which the severe terms exacted by Russia were modified, but the power of Turkey in Europe much reduced. Rumania, Servia and Montenegro, were made independent states, Bulgaria was made an autonomous but tributary province, Eastern Rumelia was granted administrative autonomy, and Bosnia and Herzegovina were placed under Austrian administration. Greece gained an accession of territory and Bessarabia was restored to Russia.

Berlin, a four-wheeled carriage for two occupants.

Berlin, a city of Wisconsin, in Green Lake and Waushara counties. Pop. 5000.

Berlin, a thriving city in Coos Co., New Hampshire, 98 miles N. W. of Portland; incorporated in 1890. It has pulp and paper mills and abundant water-power. Pop. 11,780.

Berlin, the former name of a town in Canada, province of Ontario, now known as KITCHENER (q. v.). The population in 1910 was 19,767.

Berlin Blue. See *Blue*.

Berlin Spirit, a coarse spirit distilled from potatoes, beets, etc.

Berlioz (ber-li-oz), HECTOR, a French composer, born in 1803. He forsook medicine to study music at the Paris Conservatoire, where he gained the first prize in 1830 with his cantata *Sardanapale*. For about two years he studied in Italy, and when on his return he began to produce his larger works, he found himself compelled to take up the pen both in defense of his principles and for his own better maintenance. As critic of the *Journal des Debats* and feuilletonist he displayed scarcely less originality than in his music, his chief literary works being the *Traité d'Instrumentation*, 1844; *Voyage Musical*, 1845; *Les Soirées d'Orchestre*, 1853; and *A travers Chant*, 1862. His musical works belong to the Romantic school, and are especially noteworthy for the resource they display in orchestra coloring. The more important are *Harold en Italie*; *Episode de la Vie d'un Artiste*, and *Le Retour à la Vie*; *Romeo and Juliette*, 1834; *Damnation de Faust*, 1846; the operas *Benvenuto Cellini*, *Beatrice and Benedict*, and *Les Troyens*; *L'Enfance du Christ*, and the *Te Deum*. He married an English actress, Miss Smithson, but later lived apart from her. He died in 1869. After his death appeared *Mémoires* written by himself.

Berm, in fortification, a level space a few feet wide between the out-

side slope of a rampart and the scarp of the ditch.

Bermondsey (ber-mond-si), a parli. division of London, on the Surrey side of the Thames, between Southwark and Rotherhithe. Has large tan-yards and wharfs. Pop. 125,900.

Bermuda Grass (ber-mū'da), *Cynopoda dactylon*, a grass cultivated in the West Indies, United States, etc., a valuable pasture grass in warm climates owing to its resistance to the effects of droughts.

Bermudas, or **SOMERS ISLANDS**, a cluster of small islands in the Atlantic Ocean belonging to Britain, and numbering over 300, of which only a few are inhabited. They occupy a space of about 20 miles long and 6 wide, the total area being 104 sq. miles. They were first discovered by Juan Bermudez, a Spaniard, in 1522; in 1609 Sir George Somers, an Englishman, was wrecked here, and, after his shipwreck, formed the first settlement. The most considerable are St. George, Bermuda or Long Island (with the chief town Hamilton, the seat of the governor), Somerset, St. David's and Ireland. They form an important British naval and military station. An immense iron floating-dock, capable of receiving a vessel of large tonnage, was towed from London to the Bermudas in 1868. The climate is generally healthy and delightful, but they have been sometimes visited by yellow fever. Numbers of persons from the United States and Canada now pass the colder months of the year in these islands. About 4000 acres are cultivated. The soil, though light, is in general rich and fertile; there is, however, little fresh water except rain-water, preserved in cisterns. The inhabitants cultivate and export potatoes, arrow-root, onions, bananas, tomatoes, etc. Oranges and other fruits are also cultivated. The military usually stationed here number about 1500 men. Bermuda exports great quantities of lilies to the United States. Pop. in 1911 18,904, of whom 8691 were whites.

Bern, a town in Switzerland, capital of the canton Bern, and, since 1848, of the whole Swiss Confederation, stands on the declivity of a hill washed on three sides by the Aar. The principal street is wide and adorned with arcades and curious fountains; the houses generally are substantially built of stone. Among the public buildings are the great Gothic cathedral, built between 1421 and 1502, and restored in 1887; the federal-council buildings; the old fortifications, commanding a splendid view of the Alps; the university; the town-house, a Gothic edifice of the fifteenth century; the mint, etc. Bern has an academy and several

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literary societies, and an excellent public library. Trade and commerce lively; manufactures: woollens, linens, silk stuffs, stockings, watches, clocks, toys, etc. Few cities have finer promenades, and the environs are very picturesque. Bern became a free city of the empire in 1218. In 1353 it entered the Swiss Confederacy. Pop. 80,095.—The canton of Bern has an area of 2657 square miles. The northern part belongs to the Jura mountain system, the southern to the Alps; between these being an elevated undulating region where is situated the Emmenthal, one of the richest and most fertile valleys in Switzerland. The southern part of the canton forms the Bernese Oberland (Upperland). The lower valleys here are fertile and agreeable; higher up are excellent Alpine pastures; and above them rise the highest mountains of Switzerland (Finsteraarhorn, Schreckhorn, Wetterhorn, Eiger, and Jungfrau). The canton is drained by the Aar and its tributaries; the chief lakes are those of Brienz, Thun, and Bienne. Of the surface over 58 per cent is under cultivation or pasture. Agriculture and cattle-rearing are the chief occupations; manufactures embrace linen, cotton, silk, iron, watches, glass, pottery, etc. Bienne and Thun are the chief towns after Bern. Pop. 642,215, six-sevenths being Germans and a still larger proportion Protestant.

Bernadotte (ber-nä-dot), JEAN BAPTISTE JULES, a French general, afterwards raised to the Swedish throne, was the son of an advocate of Pau, born in 1763. He enlisted at seventeen, became sergeant-major in 1789, and subaltern in 1790. In 1794 he was appointed a general of division, and distinguished himself greatly in the campaign in Germany, and on the Rhine. In 1798 he married Mademoiselle Clary, sister-in-law of Joseph Bonaparte. In the following year he was for a short time minister of war, and on the establishment of the empire was raised to the dignity of marshal of France, with the title of Prince of Ponte-Corvo. In 1810, partly on account of his great popularity, the heir appanage to the Swedish crown was offered to the Prince of Ponte-Corvo, who accepted with the consent of the emperor, went to Sweden, abjured Catholicism, and took the title of Prince Charles John. In the maintenance of the interests of Sweden a serious rupture occurred between him and Bonaparte, followed in 1812 by his joining the coalition of sovereigns against Napoleon. At the battle of Lepsic he contributed effectually to the victory of the allies. At the close of the war strenuous attempts were made by the Emperor of Austria and other sovereigns to restore the family of Gustavus IV to

the crown; but Bernadotte, retaining his position as crown-prince, became King of Sweden on the death of Charles XIII in 1818, under the title of Charles XIV. During his reign agriculture and commerce made great advances, and many important public works were completed. He died 8th March, 1844, and was succeeded by his son Oscar.

Bernard (ber-när), CHARLES DE, a French novelist of the school of Balzac, born in 1804; died in 1850. His best works were: *Le Gerfaut*, 1838; *La Peau du Lion*, 1841; and *Le Gentilhomme Campagnard*, 1847. Many of his earlier works, however, are also widely known, especially the *Nœud Gordien*. He also wrote poems and dramatic pieces.

Bernard (ber-när), CLAUDE, a French physiologist, born in 1813; studied at Paris; held in succession chairs of physiology in the Faculty of Sciences, the College of France, and the Museum, and died at Paris in 1878. Amongst his many works may be cited his *Researches on the Functions of the Pancreas*, 1844; and *Researches on the Sympathetic System*, 1852.

Bernard (bër'närd), EDWARD, English scholar, born 1638; died 1697. He was Savilian professor of astronomy at Oxford 1673-91.

Bernard (bër'närd), SIR FRANCIS, Colonial governor, born in 1711; died there 1779. In 1755 he was appointed governor of New Jersey, and transferred to Massachusetts in 1760, where he made himself unpopular among the Colonists by his support of all measures obnoxious to the Colonists. When he left Boston on his recall to England as a token of the rejoicing of the people, bells were rung, cannon were fired and the 'Liberty-tree' was hung with flags.

Bernard (ber-när), SIMON, military officer, born in France 1773. He came to the United States in 1821 with Lafayette. While chief engineer of the United States army he built Fort Monroe, and had a part in the construction of the Chesapeake and Ohio Canal and the Delaware Breakwater.

Bernard, GREAT ST., a celebrated Alpine pass in Switzerland, in the canton Valais, on the mountain-road leading from Martigny in Switzerland to Aosta in Piedmont, and rising to a height of 8150 feet. Almost on the very crest of the pass is the famous Hospice. The buildings are substantially built of stone and are capable of accommodating seventy or eighty travelers with beds, and sheltering 300, and is tenanted by a number of brethren of the order of St. Augustine. The hospice is connected with a station in the valley below, from which the monks are warned by telephone when

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travelers are on their way up the mountain. The construction of railways has greatly diminished the importance of the pass. The dogs kept at St. Bernard, to assist the brethren in their humane labors, are well known. The true St. Bernard dog was a variety by itself, but this is now extinct, though there are still descendants of the last St. Bernard crossed with other breeds, to conform as much as possible to the original breed. The color of these great dogs is reddish or orange, marked with white on muzzle, neck, chest, feet, and tip of tail; head large and broad, muzzle short, lips somewhat pendulous, hanging ears. A pagan temple formerly stood on the pass, and classic remains are found in the vicinity. The hospice was founded in 962 by St. Bernard of Menthon, an Italian ecclesiastic, for the benefit of pilgrims to Rome. In May, 1800, Napoleon led an army, with its artillery and cavalry, into Italy by this pass.

Bernard, *LITTLE ST.*, a mountain of Italy, belonging to the Graian Alps, about 10 miles s. of Mont Blanc. The pass across it, one of the easiest in the Alps, is supposed to be that which Hannibal used. Elevation of Hospice, 7192 feet.

Bernard, *SAINT*, of Clairvaux, one of the most influential ecclesiastics of the middle ages, born at Fontaines, Burgundy, in 1090, of noble descent. In 1113 he became a monk at Cîteaux; in 1115 first abbot of Clairvaux, the great Cistercian monastery near Langres. His austerities, tact, courage and eloquence speedily gave him a wide reputation; and when, on the death of Honorius II (1130), two popes, Innocent and Anaclete, were elected, the judgment of Bernard in favor of the former was accepted by nearly all Europe. In 1141 he secured the condemnation of Abeldar for heresy; and after the election of his pupil, Eugenius III, to the papal chair, he may be said to have exercised supreme power in the church. After the capture of Edessa by the Turks he was induced to preach a new crusade, which he did (1146) so effectively as to raise a large host, which, however, met with disaster and death. He died Aug. 20, 1153. Over seventy monasteries owed their foundation or enlargement to him; and he left many epistles, sermons, and theological and moral treatises. A number of hymns ascribed to him survive, among them being, *Jesu dulcis memoria*, and *Salvo caput cruentatum*. Canonized in 1174.

Bernard de Ventadour, a troubadour of the twelfth century. The son of a domestic servant, he was detected in an amour with the wife of his master, the Comte de Ventadour, and took refuge at

the court of Raymond V, Comte de Toulouse. His songs, which were praised by Petrarch, are yet highly esteemed.

Bernardine Monks (*bér'nar-din*), a name given in France to the Cistercians, after St. Bernard. See *Cistercians*.

Bernardo Del Carpio (*bér-nar'dó*), a half legendary Spanish hero of the ninth century, son of Ximena, sister of Alphonso the Chaste, by Don Sancho of Saldaña. Alphonso put out the eyes of Don Sancho and imprisoned him, but spared Bernardo, who distinguished himself in the Moorish wars, and finally succeeded in obtaining from Alphonso the Great the promise that his father should be given up to him. At the appointed time his father's corpse was sent to him and Bernardo in disgust quitted Spain for France, where he spent the remainder of his life as a knight errant.

Bernard of Morlaix, a monk of Cluny under Peter the Venerable (1122-56). He wrote a Latin poem on *Contempt of the World* in about 3000 leonine dactylic verses, from which are taken the popular hymns, *Jerusalem the Golden*, *Brief Life is here our Portion*, etc.

Bernard of Treviso, a noted Italian alchemist, born at Padua 1406; died 1490. His most important work was *Tractatus de secretissimo philosophorum opere chemico*, 1600.

Bernauer (*ber'nou-ér*), AGNES, the daughter of an Augsburg baker or barber, whom Albert, only son of the reigning Duke of Bavaria, secretly married. Not knowing that the union was a lawful one, Duke Ernest urged his son to marry. Albert thereupon confessed that Agnes was his lawful spouse, which so incensed the duke that, during his son's absence, he had Agnes seized and condemned to death on a charge of sorcery. She was drowned in the Danube near Straubing, where her remains were subsequently interred by Albert. Her story forms the subject of works by Törring, Körner, Böttger, Hebbel and Meyr.

Bernay (*ber-nä*), a town of France, dep. of Eure, on the Charentonne, with some manufactures and a horse-fair, held in the fifth week in Lent, one of the largest in France. Pop. 5973.

Bernburg (*bern'burh*), a town of Germany, duchy of Anhalt, on both sides of the Saale, divided into the old, the new, and the high town; the first two communicating by a bridge with the latter. It contains an oil-mill, breweries, distilleries; and manufactures paper, earthenware, copper and tin wares, etc. Pop. 34,929.

Berne. See *Bern*.

Berners, JOHN BOUCHIER, LORD, an English statesman and writer, born about 1469. He became chancellor of the exchequer in 1515, and was for many years governor of Calais; died in 1532. He translated Froissart's *Chronicles*, 1523-25, and other works, his translation of the former being a sort of English classic.

Berners, or BARNES, JULIANA, LADY, an English writer of the fifteenth century, of whom little more is known than that she was prioress of the nunnery of Sopwell, near St. Alban's. The book attributed to her is entitled in the edition of Wynkyn de Worde (1496), *Treatyse perteynynge to Hawkyngs, Huntynge and Fysshynge with an angle; also a right noble Treatyse on the Lyngys of Cot Armour*, etc. The treatises on fishing and on coat-armour did not appear in the first St. Alban's edition of 1481. It was for a long time the popular sporting manual.

Bernese Alps, the portion of the northern side of the Rhone Valley, and extends from the Lake of Geneva to that of Brienz, comprising the Finsteraarhorn, Schreckhorn, Jungfrau, Monk, etc.

Bernhard (bern'härt), Duke of Saxe-Weimar, general in the Thirty Years' war, born in 1604, the fourth son of Duke John of Saxe-Weimar, entered the service of Holland, and afterwards the Danish army employed in Holstein. He then joined Gustavus Adolphus, and in the battle of Lützen, 1632, commanded the victorious left wing of the Swedish army. In 1633 he took Bamberg and other places, was made Duke of Franconia, and after the alliance of France with Sweden raised an army on the Rhine to act against Austria. After many brilliant exploits he captured Breisach and other places of inferior importance, but showed no disposition to hand them over to the French, who began to find their ally undesirably formidable. He rejected a proposal that he should marry Richelieu's niece, the Duchess d'Aiguillon, seeking instead the hand of the Princess of Rohan. This the French court refused lest the party of the Huguenots should become too powerful. He died somewhat suddenly in 1639 at Neuberg, the common opinion being that he was poisoned by Richelieu.

Bernhardi (bern-här'di), GENERAL FRIEDRICH A. J. VON, a German soldier and military expert, born in 1840; served in the cavalry. He is commonly believed to represent the German militarist of the most influential

type, and his books have figured prominently in discussions of German militarism. *Germany and the Next War* in which he expounded many of the theories put into practice in the European War, has had a wide circulation in America.

Bernhardt (bern'härt), SARAH, (ROSINE BERNARD), a distinguished French actress, born at Paris in 1845; of Jewish descent, and of mixed French and Dutch parentage. In 1858 she entered the Paris Conservatoire and gained prizes for tragedy and comedy in 1861 and 1862; but her début at the Théâtre Française in *Iphigénie* was not a success. After a brief retirement she reappeared at the Gymnase and the Porte Saint-Martin in burlesque, and in 1867 at the Odéon in higher drama. Her success in Hugo's *Ruy Blas* led to her being recalled to the Théâtre Français, after which she abundantly proved her dramatic genius. In 1882 she married M. Damala, a Greek. Her tours both in Europe and America never failed to be successful despite a marked degree of eccentricity. She has exhibited as a sculptor at the Salon, and has written her autobiography.

Berni (bér'nè), FRANCESCO, an Italian burlesque poet of the sixteenth century, born about 1498 in Tuscany. He took orders, and about 1530 became a canon of the Florence Cathedral, where he lived till his death in 1536. A vague story asserts that Berni, who was intimate with both Alessandro de' Medici and Ippolito de' Medici, was requested by each to poison the other, and that on his refusal he was poisoned himself by Alessandro. He takes the first place among the Italian comic poets. He wrote good Latin verses, and his *rifacimento* of Boiardo's *Orlando Innamorato* is an admirable work of its class.—Another Berni (COUNT FRANCESCO BERNI, who was born in 1610 and died in 1673) wrote eleven dramas and a number of lyrics.

Bernicia (ber-ní'shi-a), an ancient Anglican kingdom stretching from the Firth of Forth to the Tees and extending inland to the borders of Strathclyde. It was united with Deira and became part of the Kingdom of Northumbria.

Bernicle Goose. See *Barnacle Goose*.

Bernier (bern-yä), FRANÇOIS, French physician and traveler, born at Angers about 1625; set out on his travels in 1654, and visited Egypt, Palestine, and India, where he remained for twelve years as physician to the Great Mogul emperor Aurungzebe. After his return to France he published

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Fravele, an abridgement of the *Philosophy of Gassendi*, a *Treatise on Freedom and Will*, and other works. He died at Paris in 1688.

Bernina (ber-né'ná), a mountain in the Rhetian Alps, 13,000 feet high, with the large Morteratsch Glacier. The Bernina Pass on the west of the mountain is 7695 feet in height.

Bernini (ber-né'né), GIOVANNI LORENZO, an Italian painter, sculptor, and architect (1598-1680). His marble group, *Apollo and Daphne*, secured him fame at the age of eighteen and he was employed by Urban VIII to prepare plans for the embellishment of the Basilica of St. Peter's. His architectural designs, including the great colonnade of St. Peter's, perhaps brought him his greatest celebrity. In 1663 he accepted the invitation of Louis XIV to visit Paris, traveling thither in princely state and with a numerous retinue.

Bernis (ber-né), FRANÇOIS JOACHIM DE PIERRE DE, cardinal and minister of Louis XV, born in 1715; died in 1794. Madame de Pompadour presented him to Louis XV, who assigned him an apartment in the Tuilleries, with a pension of 1500 livres. After winning credit in an embassy to Venice he rose rapidly to the position of minister of foreign affairs, and is possibly to be credited with the formation of the alliance between France and Austria which terminated the Seven Years' War. The misfortunes of France being ascribed to him, he was soon afterwards banished from court, but was made Archbishop of Alby in 1764, and in 1769 ambassador to Rome, where he remained till his death. When the aunts of Louis XVI left France in 1791 they fled to him for refuge, and lived in his house. The revolution reduced him to a state of poverty, from which he was relieved by a pension from the Spanish court. His verse procured him a place in the French Academy. The correspondence of Bernis with Voltaire contains matter of interest.

Bernissartia (ber-ni-sär'ti-a), a genus of extinct Wealden crocodiles, the type of the family *Bernissartiidae*, whose remains have been found in a quarry in Bernissart, Belgium.

Bernouilli, or **BERNOULLI** (ber-nö-ye), a family which produced eight distinguished men of science. The family fled from Antwerp during the Alva administration, going first to Frankfurt, and afterwards to Basel.—1. JAMES, born at Basel in 1654, became professor of mathematics there 1687, and died 1705. He applied the differential calculus to difficult questions of geometry and mechanics; calculated the loxodromic and

catenary curve, the logarithmic spirals, the evolutes of several curved lines, and discovered the so-called *numbers of Bernouilli*.—2. JOHN, born at Basel in 1687, wrote with his brother James a treatise on the differential calculus; developed the integral calculus, and discovered, independently of Leibnitz, the exponential calculus. After the death of his brother in 1705 he received the professorship of mathematics at Basel, which he held until his death in 1748.—3. NICHOLAS, nephew of the former, born at Basel in 1687; in 1705 went to Groningen to John Bernouilli, and returning with him to Basel, John becoming professor of mathematics. On the recommendation of Leibnitz he went as professor of mathematics to Padua in 1716, but returned to Basel in 1722 as professor of logic, and in 1731 became professor of Roman and feudal law. He died in 1759. The three following were sons of the above-mentioned John Bernouilli.—4. NICHOLAS, born at Basel 1695, became professor of law at Bern in 1723, and died in St. Petersburg in 1728.—5. DANIEL, born at Groningen 1700; studied medicine. At the age of twenty-five he went to St. Petersburg, returning in 1733 to Basel, where he became professor of natural philosophy. He retired in 1777, and died in 1782.—6. JOHN, born at Basel in 1710, went to St. Petersburg in 1732, became professor of rhetoric at Basel in 1743, and in 1748 professor of mathematics. He died in 1790. The two following were his sons:—7. JOHN, licentiate of law and royal astronomer in Berlin, born at Basel in 1744; died 1807.—8. JAMES, born at Basel in 1759; went to St. Petersburg, where he became professor of mathematics; died in 1789.

Bernstein (bern'stîn), EDUARD, a German writer and Social-Democratic leader, born in Berlin in 1850; turned his attention to political writing in 1878; served in the Imperial Reichstag, 1902-06. His books have given rise to keen discussion in the German Socialist party.

Bernstein, FRAU (ELSA FORGES), a German writer of plays, born at Vienna in 1866. Her *Königskinder* was used by Humperdinck as the basis of one of his operas. She also wrote *Dämmerung*, *Mutter Maria*, *Achilles* (1910), etc.

Bernstorff, the name of a German distinguished noble family, its most distinguished member being JOHANN HARTWIG ERNST, Count von Bernstorff, Danish statesman under Frederick V and Christian VII, born in Hanover in 1712. He was the most influential member of the government, which distinguished itself under his direction by a wise neutrality

Bernstorff

Beroe

during the Seven Years' war, etc., by measures for improving the condition of the Danish peasantry; by promoting science, and sending to Asia the expedition which Niebuhr accompanied. By his efforts Denmark acquired Holstein. He died in 1772.

Beroe (ber'o-ë), a genus of small marine, coelenterate animals, order Ctenophora, transparent and gelatinous, globular in form, floating in the sea, and shining at night with phosphoric light.

Berosus (be-rô'sus), a priest of the temple of Belus at Babylon early in the third century B.C., who wrote in Greek a history of the Babylonian Chaldeans, founded on the ancient archives of the temple of Belus. It is known only by the quotations from it in Eusebius, Josephus, etc.

Berquin (ber-kan), ARNAUD, a French writer, born in 1749. He first attracted notice by his *Idylles*, and by several translations entitled *Tableaux Anglais*; but was best known by his *Amis des Enfants*, a series of narratives for children, for which, though plagiarized from Weiss's *Kinderfreund*, he received the prize of the French Academy in 1789. He was for some time the editor of the *Moniteur*. He died in 1791.

Berri, or BERRY (ber'ri, Fr. pron. bâ-rê'), formerly a province and dukedom, with Bourges as capital, almost in the center of France. It is now mainly comprised in the departments Indre and Cher.

Berri, or BERRY (bâ-rê), CHARLES FERDINAND, DUKE OF, second son of the Count d'Artois (afterwards Charles X), born at Versailles in 1778. In 1792 he fled with his father to Turin and served under him and Condé on the Rhine. In 1801 he came to Britain, where he lived alternately in London and Scotland, occupied with plans for the restoration of the Bourbons. In 1814 he landed at Cherbourg, and passed on to Paris, gaining many adherents to the royal cause; but they melted away when Napoleon landed from Elba, and the count was compelled to retire with the household troops to Ghent and Alost. After the battle of Waterloo he returned to Paris, and in 1816 married. He was assassinated by Louvel, a political fanatic, on Feb. 14, 1820. The duke had by his wife, Carolina Ferdinanda Louisa, eldest daughter of Francis, afterwards King of the Two Sicilies, a daughter, Louise Marie Thérèse, afterwards Duchess of Parma, and a posthumous son subsequently known as Comte de Chambord.

Berry, SIR EDWARD, a British admiral, born 1766; died 1831. He

served with Nelson in 1796 and was flag captain to Nelson at the battle of the Nile. He commanded the *Agamemnon* in the battles of Trafalgar and San Domingo. In 1821 he attained the rank of rear admiral.

Berry, MARY, an English author, born in 1763; died in 1852. She is known chiefly for her association with Horace Walpole, whose works she edited (1798). Among other works she published *England and France: a Comparative View of the Social Condition of Both Countries*.

Berry (ber'i), a succulent fruit, in which the seeds are immersed in a pulpy mass enclosed by a thin skin. The name is usually given to fruits in which the calyx is adherent to the ovary and the placentas are parietal, the seeds finally separating from the placenta and lying loose in the pulp. The term, however, is frequently used to include fruits in which the ovary is free and the placentas central, as the grape. Popularly it is applied to fruits like the strawberry bearing external seeds on a pulpy receptacle, but not strictly berries.

Berryer (ber-yâ), ANTOINE PIERRE, French advocate and statesman, born in Paris 1790. He assisted his father in defense of Ney, secured the acquittal of General Cambronne, and defended Lamennais from a charge of atheism. His eloquence was compared with that of Mirabeau, and after the dethronement of Charles X (1830) he remained in the Chamber as the sole Legitimist orator. In 1840 he was one of the counsel for the defense of Louis Napoleon, after the Boulogne fiasco. In 1843 he did homage to the Comte de Chambord in London, adhering to him through the revolution of 1848, and voting for the deposition of the prince-president the morning after the *coup d'état*. He gained additional reputation in 1858 in his defense of Montalembert. In 1860 he was re-elected to the chamber with Thiers, and in 1864 received a flattering reception in England. He died in 1866.

Bersaglieri (ber-sâl-yâ-rê), a corps of Italian sharpshooters organized early in the reign of Victor Emmanuel. Many of them are now mounted on bicycles, and form an important auxiliary to the light moving troops of the army.

Berserker (bér-sér'kir), a Scandinavian name for warriors who fought in a sort of frenzy or recklessness, dashing themselves on the enemy in the most regardless manner. The Berserker was said to have been a giant, the grandson of the eight-headed Starkader and the fair Alfhilde. He wore no mail in battle, and had two

sons, also called *Berserker*. The name is probably derived from the bear-sart or bear-skin shirt worn by early warriors.

Bert, PAUL, physiologist, born at Auxerre, France, in 1833; died in 1886. He studied law and medicine, was Claude Bernard's ablest pupil. He was professor of natural sciences at Bordeaux in 1860, assistant professor of physiology at Paris, 1869. He was an enthusiastic teacher, and served as minister of public instruction 1881-82, vigorously opposing the religious element in education. He was the author of a number of scientific works, among them *La Pression barométrique*.

Berthelot (bert-lō), MARCELLIN PIERRE EUGENE, a noted chemist, born in Paris in 1827; died in 1907. Made professor of organic chemistry in the College of France in 1864, he won distinction by the synthesis of various organic compounds. He was elected perpetual secretary of the Academy of Science in 1889, held several cabinet positions in the French government, and was elected to the French Academy in 1900.

Berthier (bert-yā), ALEXANDRE, prince of Neuchâtel and Wagram, marshal, vice-constable of France, etc.; born 1753; son of a distinguished officer. While yet young he served in America with Lafayette, and after some years' service in France he joined the army of Italy in 1795 as general of division and chief of the general staff, receiving in 1798 the chief command. In this capacity he entered Rome. He followed Bonaparte to Egypt as chief of the general staff; was appointed by him minister of war after the 18th Brumaire; accompanied him to Italy in 1800, and again in 1805, to be present at his coronation; and was appointed chief of the general staff of the grand army in Germany. In all Napoleon's expeditions he was one of his closest companions, on several occasions rendering valuable services, as at Wagram in 1809, which brought him the title of *Prince of Wagram*. After Napoleon's abdication he was taken into the favor and confidence of Louis XVIII, and on Napoleon's return the difficulty of his position unhinged his mind, and he put an end to his life by throwing himself from a window. He left a son, Alexander (born in 1810), one of the most zealous adherents of Napoleon III.

Berthollet (ber-to-lā), CLAUDE LOUIS, COUNT, an eminent French chemist, born in 1748; studied medicine; became connected with Lavoisier; was admitted in 1780 member of the Academy of Sciences at Paris; in 1794 professor in the normal school there. He followed

Bonaparte to Egypt, and returned with him in 1799. Notwithstanding the various honors conferred on him by Napoleon he voted in 1814 for his dethronement, and was made a peer by Louis XVIII. His chief chemical discoveries were connected with the analysis of ammonia, the use of chlorine in bleaching, the artificial production of niter, etc. His most important works were his *Essai de Statique Chimique* (1803), and the *Méthode de Nomenclature Chimique* (1787). He died at Paris in 1822.

Bertholletia (ber-to-lā'sha), a name given in honor of Berthollet to a genus of plants of the family *Lecythidaceæ*, consisting of two species, *B. excelsa* and *B. nobilis*. They form vast forests on the banks of the Amazon, Rio Negro, and Orinoco, the trees averaging 100 feet in height. The *B. excelsa* produces the well-known Brazil-nuts of commerce, which are contained in a round and strong seed-vessel, to the number of from fifteen to fifty or more, and contain a great deal of oil.

Berthon, EDWARD LYON, English clergyman and inventor, born 1813; died 1899. He experimented with the screw-propeller, invented a marine speed indicator, known as 'Berthon's log,' and a folding boat.

Bertie (bér'ti), of Thame, Viscount, British ambassador to France from 1905 to 1918. He was born in 1844; died September 26, 1919.

Bertillon System (ber-till-lon), a method devised for the identification of criminals by Dr. Alphonse Bertillon, of Paris, in 1885. Formerly photographs and descriptions were depended upon, but he inaugurated a system of exact measurements of various parts of the body, head and limbs, which cannot well be duplicated in any two individuals. The print of the thumb, with its series of regular skin lines, is one of these means of identification, the prints differing for each individual.

Bertold von Regensburg, the greatest German preacher of the middle ages, was born about 1220, at Regensburg, and entered the Franciscan monastery there. By the time he was thirty his fame as a preacher had spread over all the German-speaking parts of Europe. In his sermons he did much to hasten the decline of Middle High German poetry by his condemnation of the elegant world of chivalry. Died 1272.

Bertrand, HENRI GRATIEN, COMTE, French general and companion of Napoleon at St. Helena, was born at Châteauroux, France, in 1773; died there in 1844. He served with distinction in Napoleon's Austrian campaign,

at Wagram, in Russia and at Waterloo. At Leipsic he is credited with having saved the French army from annihilation. In 1840 he was chosen by the French nation to bring Napoleon's remains to France. A posthumous work, *Les campagnes d'Egypte et de Syrie, mémoires pour servir à l'histoire de Napoléon, dictés par lui-même, à Sainte-Hélène, au général Bertrand*, was published in 1847.

Berwick (ber'ik), or more fully, **Berwick-on-Tweed**, a seaport town of England, formerly a parl. bor. and a county by itself, but now incorporated with Northumberland, and giving name to a parl. div. of the county. It stands on the north or Scottish side of the Tweed, within half a mile of its mouth. It is surrounded by walls of earth faced with stone. The Tweed is crossed by an old bridge and by a fine railway viaduct, these connecting it with its suburbs Tweedmouth and Spittal, the latter a favorite watering-place. Chief industries: iron manufactures, agricultural implements, etc. Pop. 13,075.—The county of Berwick, the most eastern border-county of Scotland. Total area, 464 sq. miles, of which two-thirds are productive. The principal rivers are the Tweed and the Eye. The county is in high repute for agriculture, but has few manufactures. Pop. of county, 30,800.

Berwick, a borough of Columbia County, Pa. Flour and planing-mills, manufactories of pipe and pottery, and iron works are its principal industries. Pop. (1910) 5357.

Berwick, JAMES FITZ-JAMES, DUKE OF YORK (afterwards James II) and Arabella Churchill, sister of Marlborough, was born at Moulins, in the Bourbonnais in 1670, and first went by the name of Fitz-James. He received his education in France, served in Hungary, returned to England at the age of seventeen, and received from his father the title of duke. On the landing of the Prince of Orange he went to France with his father, and he was wounded at the battle of the Boyne, where he nominally commanded. He afterwards served under Luxembourg in Flanders; in 1702 and 1703 under the Duke of Burgundy; then under Marshal Villeroy. In 1706 he was made marshal of France, and sent to Spain, where he gained the battle of Almanza, which rendered Philip V again master of Valencia. He was killed by a cannonball at the siege of Philipsburg in 1734.

Berwyn, a city of Cook County, Ill., incorporated in 1902. Pop. (1910) 5357.

Beryl, a colorless, yellowish, bluish, or less brilliant green variety

of emerald, the prevailing hue being green of various shades, but always present the want of color being due to absence of chromium, which gives to the emerald its deep rich green. Its crystals, which are six-sided, are usually longer and larger than those of the precious emerald and its structure more distinctly foliated. The best beryls are found in Brazil, Siberia, and Ceylon, and in Dauria, the frontiers of China. Beryls are also found in many parts of the United States. Some of the finer and transparent varieties of it are often called aquamarine.

Beryllium (ber-il'yum), a metal occurring in beryl and other minerals of a color similar to zircon. Specific gravity 1.64; malleable; does not oxidize in air or water. Atomic weight 9.4; symbol Be.

Berzelius (ber-zel'i-us), JÖN JAKOB, BARON, a Swedish chemist, born in 1779; studied medicine at Upsala, and after holding one or two medical appointments was appointed professor in chemistry in the Stockholm university academy in 1806, and the following year professor of pharmacy and medicine. In 1808 he became a member of the Academy of Sciences at Stockholm, and in 1810 director, and in 1818 its perpetual secretary. In 1818 the king made him a noble, and in 1835 a baron. He discovered selenium and thorium, first exhibited calcium, barium, strontium, tantalum, silicium, and zirconium in the elementary state, and investigated whole classes of compounds, as those of fluoric acid, and metals in the ores of platinum, tantalum, molybdenum, vanadium, sulphur, etc., and introduced a new nomenclature and classification of chemical compounds. In short, there was no branch of chemistry to which he did not render essential service. His writings comprise an important *Text-book of Chemistry*, *of the Composition of Animal Fluids*, *System of Mineralogy*, *Essay on the Theory of Chemical Proportions*, etc. He died in 1848.

Bes, the Egyptian god of recreation, represented clad in the skin of an animal, with large head, goggle-sloppy beard, and with a dwarfish and together grotesque appearance.

Besançon (bè-sân-sôn), a town in Eastern France, capital of the department Doubs, is situated on a rocky peninsula washed on three sides by the river Doubs, and surmounted by a strong citadel. It is the birthplace of Victor Hugo, to whom a statue is erected in the town. The streets are clean and well laid out, with fine cathedrals and churches, public buildings and

Besançon

hue being always pale, to absence of the emerald stains, which no longer and thus emerald, but foliated. In Brazil, in Dauria, on hills are also in the United States. transparent called aqua-

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JÖNS JÖNS, a Swedish chemist, one or two appointed lecturer at the following and medicine. member of the Stockholm, in its perpetual made him a He discovered exhibited, tantalum, the elemental classes of acid, the m, tantalum, sulphur salts, nomenclature compounds each of chem- nder essential prise an im- nistry, View Fluids, New say on the ons, etc. He

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grades. The manufactures comprise linen, cotton, woolen, and silk goods, ironmongery, etc.; but the principal industry is watchmaking, which employs about 13,000 persons. Besançon is the ancient *Vesontio*, *Besontium* or *Bisontium*, described by Cæsar. In the fifth century it came into possession of the Burgundians; in the twelfth passed with Franche-Comté to the German Empire. In 1679 it was ceded to France along with the rest of Franche-Comté, of which it remained the capital till 1793, with a parliament, etc., of its own. Pop. 41,760.

Besant (be-zant'), ANNIE, theosophist, born at London in 1847. Radical in view, she joined the National Secular Society in 1874, worked in the Free Thought movement of Charles Bradlaugh, became an ardent Socialist, and in 1889 joined the Theosophical Society, eventually succeeding Madame Blavatsky as its head.

Besant, SIR WALTER, an English novelist, born in 1836, educated in London and at Christ College, Cambridge, where he graduated with mathematical honors. He was for a time professor in the Royal College, Mauritius. He was long secretary to the Palestine Exploration Fund, and published a *History of Jerusalem* in connection with Prof. Palmer. He is best known by his novels, a number of which were written in partnership with James Rice, including *Ready-Money Mortiboy*; *This Son of Vulcan*; *The Case of Mr. Lucraft*; *The Golden Butterfly*; *The Monks of Thelama*; etc. After Rice's death (1882), he produced *All Sorts and Conditions of Men*; *All in a Garden Fair*; *Dorothy Forster*; *The World Went very Well Then*; etc. He undertook a series of important historical and archaeological volumes, dealing with the associations and development of the various districts of London, and produced *A Survey of London* (left unfinished); *London* (1892); *Westminster* (1895); and *South London* (1899). He died June 9, 1901.

Bessarabia (bes-sa-rā'bi-a), a Russian province stretching in a northwesterly direction from the Black Sea, between the Pruth and Danube and the Dniester. It was conquered by the Turks in 1503, taken by the Russians in 1770, ceded to them by peace of Bucharest in 1812; the s. e. extremity was given to Moldavia in 1856; but restored to Russia by treaty of Berlin in 1878. In the north the country is hilly, but in the south flat and low. It is fertile in grain, but is largely used for pasturage. Wine making is a profitable industry. Capital, Kishinef; area, 17,614 sq. miles. Pop. about 2,500,000.

Bessarion (bes-sil'ri-on), JOHANNES, titular patriarch of Constantinople and Greek scholar, born in Trebizond 1389 or 1395; died in 1472. He was made Archbishop of Nicea by John VII Palæologus, whose efforts to unite the Greek and Roman churches he seconded in such a way as to lose the esteem of his countrymen and gain that of Pope Eugenius IV, who made him cardinal. He held various important posts, and was twice nearly elected pope. The revival of letters in the fifteenth century owed not a little to his influence. He left translations of Aristotle and vindications of Plato, with valuable collections of books and MSS.

Besseges (bā-sāzh), a town of Southern France, department of Gard, with important coal and iron mines and blast-furnaces. Pop. 7662.

Bessel, FRIEDRICH WILHELM, a German astronomer, born in 1784; appointed in 1810 director of the observatory at Königsberg. He called attention to the probable existence of a planetary mass beyond Uranus, thus resulting in the discovery of Neptune. In pure mathematics he enlarged the resources of analysis by the invention of Bessel's Functions. He died in 1846. His principal works are the *Fundamenta Astronomiæ* (1818), and its continuation, the *Tabulæ Regiomontanæ* (1830) and *Astronomical Researches* (1841-42). His determination of the parallax of the star 61 Cygni was one of his most noteworthy practical achievements. Modern astronomy of precision owes much to his labors.

Bessemer (bes'se-mer), a manufacturing city of Jefferson County, Alabama, 11 miles s. w. of Birmingham, of recent origin, named after the inventor, situated in the center of coal and iron fields, and with numerous blast-furnaces and other iron-working industries. Pop. 10,864.

Bessemer, SIR HENRY, an English engineer and inventor, was born in Hertfordshire in 1813. He became celebrated for his process of rapidly making steel from pig-iron by blowing a blast of air through it when in a state of fusion, so as to clear it of all carbon, and then adding just the requisite quantity of carbon to produce steel—a process which has introduced a revolution in the steel-making trade, cheap steel being now made in vast quantities and used for many purposes in which its price formerly prohibited its application. He was knighted in 1879. Died March 15, 1898.

Bestiaries (bes'ti-ār-rēs), a name given to a class of books

very popular in the eleventh, twelfth, and thirteenth centuries, describing all sorts of animals, real and fabled, and forming a species of medieval encyclopedia of zoology. The animals were treated as symbolic, and their peculiarities or supposed peculiarities spiritually applied. The volumes are to be found both in Latin and in the vernacular, in prose and in verse.

Beta. See *Bect*.

Betanzos (be-tán'thōs), a town of Northern Spain, 10 miles S. E. of Coruña. Pop. 8948.

Bet'el, BET'LE a species of pepper, *Charica betel*, a creeping or climbing plant, native of the East Indies, nat. order *Piperaceæ*. The leaves are employed to inclose a piece of the areca or betel-nut and a little lime into a pellet, which is extensively chewed in the East. The pellet is hot and acrid, but has aromatic and astringent properties. It tinges the saliva, gums and lips a brick-red, and blackens the teeth.

Betel-nut, the kernel of the fruit of the beautiful palm *Areca catechu*, found in India and the East,



Leaf, Flowers, and nut of Betel Palm
(*Areca catechu*).

and named from being chewed along with betel-leaf. (See preceding art.) When ripe it is of the size of a cherry, conical in shape, brown externally, and mottled internally like a nutmeg. Ceylon alone exports many tons annually.

Bethany (beth'a-nē), now called *ET Azariyeh*, a village of Palestine, on the eastern slope of Mount Olivet, about 2 miles E. of Jerusalem, formerly the home of Martha, Mary and Lazarus, near which the ascension of Christ is said to have taken place.

Bethesda (be-thes'da; 'house of mercy'), a pool in Jerusalem near St. Stephen's Gate and the Temple of Omar. It is one of the sites

suggested for the pool mentioned in John V:2-9. Now known as Birket Isra'il.

Bethlehem (beth'le-hem), the birth place of Christ; a village formerly a town, Palestine, a few miles south from Jer. Pop. about 8000, chiefly Christians, who make robes, crucifixes, etc., for pilgrims. There are three convents for Catholics, Greeks and Armenians. A richly adorned grotto lighted with silver and crystal lamps under the choir of the fine church built by Constantine, is shown as the actual spot where Jesus was born.

Bethlehem, a town of Pennsylvania founded by Moravian in 1741 on the Lehigh River across which is a bridge connecting it with South Bethlehem, the seat of Lehigh University. It has silk and knitting mills, etc., and in South Bethlehem are extensive iron and steel plants. Population, 15,000.

Bethlehemites (beth'le-hem-its), name applied (1) to the followers of John Huss, from Bethlehem Church, Prague, where he preached; (2) to an order of monks established according to Matthew Paris in 1257, with a monastery at Cambridge; (3) to a community founded in Guatemala about 1655 by Pedro Betancourt, and raised to an order by Innocent XI in 1687. It spread to Mexico, Peru, and the Canary Islands. An order of nuns founded in 1667 bore the same name.

Bethlen-Gabor (bet'len-gä'bor), that is, *Gabriel-Bethlen*, born of a Protestant Magyar family in 1580; fought under Gabriel Bathori, and then joined the Turks, by whose aid he made himself Prince of Transylvania in 1613. In 1619 he assisted the Bohemians against Austria, and, marching into Hungary, was elected king by the nobles (1620). This title he surrendered in return for the cession to him by the Emperor Ferdinand of seven Hungarian counties and three fortified places. After a brilliant reign he died in 1629 without heir.

Bethmann-Hollweg (bet'män-hol'veg), THEOBALD VON, German statesman, born in 1856. He succeeded von Bulow as Chancellor in 1900, retaining office till July, 1917.

Bethnal Green, an eastern suburban district and parish of London, Middlesex, now forming a parl. bor. having two divisions with two members. Here is the Bethnal Green Museum. Pop. 128,282.

Béthune (bä-tün), an old town of France, dep. of Pas de Calais, with various industries and a considerable trade. Pop. 11,370.

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Bethune (bū-thūn'), THOMAS G., an American negro musical prodigy, better known as 'Blind Tom.' He was born about 1850, near Columbus, Ga., of slave parents. Though blind and half-witted from birth he early evinced great musical talents, and could play on the piano the most complicated and difficult composition after hearing it once performed. Died 1908.

Betlis, or BITLIS, a town of Turkish Armenia. Pop. (Turks, Kurds, and Armenians), about 25,000.

Betony, the popular name of *Stachys betonica* (or *Betonica officinalis*), a libiate plant with purple flowers which grows in woods, was formerly much employed in medicine, and sometimes used to dye wool of a fine dark-yellow color.—*Water betony*, *Scrophularia aquatica*, is named from the resemblance of its leaf to that of betony.

Betrothment (be-troth'ment), a mutual promise or contract between two parties, by which they bind themselves to marry. It was anciently attended with the interchange of rings, joining hands, and kissing in presence of witnesses; and formal betrothment is still the custom on the continent of Europe, being either solemn (made in the face of the church) or private (made before witnesses out of the church). As betrothments are contracts, they are valid only between persons whose capacity is recognized by law, and the breach of them may be the subject of litigation.

Betterton (bet'ter-ton), THOMAS, an English actor in the reign of Charles II, born in 1635; excelled in Shakespeare's characters of Hamlet, Othello, Brutus, and Hotspur, and was the means of introducing shifting scenes instead of tapestry upon the English stage. He died in 1710, and was buried in Westminster Abbey. He wrote a number of plays and the book of an opera, Mrs. Sanderson, whom he married in 1662, was also an actress of repute.

Bet'ting, the staking or pledging of money or property upon a contingency or issue. The processes of betting may be best illustrated in connection with horse-racing, which furnishes the members of the betting fraternity with their best markets. Bettors are divided into two classes—the backers of horses, and the bookmakers, or professional bettors, who form the betting ring, and make a living by betting against horses according to a methodical plan. By the method adopted by the professional bettor the element of chance is as far as possible removed from his transactions, so that he can calculate with

a reasonable prospect of having his calculations verified, on making more or less profit as the result of a season's engagements. Instead of backing any particular horse, the professional bettor lays the same sum against every horse that takes the field, or a certain number of them, and in doing so he has usually to give odds, which are greater or less according to the estimate formed of the chance of success which each of the horses has on which the odds are given. Very frequently the receipts of the bookmaker are augmented by sums paid on account of horses which have been backed and never run at all. Sometimes, although not often, the odds are given upon and not against a particular horse. Books may also be made up on the principle of betting against any particular horse getting a place among the first three. The odds in this case are usually one-fourth of the odds given against the same horse winning. Another mode of betting is that called a sweepstake, in which a number of persons join in contributing a certain stake, after which each of those taking part in the sweepstake has a horse assigned to him (usually by lot), which he backs and the backer of the winning horse gains the whole stakes. If there are more persons taking part in the sweepstake than there are horses running some of them must draw blanks, in which case of course their stakes are at once lost. In the years immediately preceding 1850 the practice of betting had increased to such an extent in England that an act for the suppression of betting-houses was passed, though it cannot be said to have been very effective. Similar legal restrictions are nominally operative in France and the United States.

Bet'tong. See *Kangaroo Rat*.

Betula (bet'u-la), the birch genus, type of the order *Betulaceæ*, which belongs to the amentaceous plants, and consists of trees or shrubs with serrate, deciduous leaves, flowers in catkins, scales in place of perianth; genera *Betula* and *Alnus* (alder).

Betwa (bet'wā), a river of India rising in the Vindhya range in Bhopal, and after a northeasterly course of 360 miles joining the Jumna at Hamirpur.

Beust (boist), FRIEDRICH FERDINAND, COUNT VON, Saxoa and Austrian statesman, was born at Dresden in 1809; died in 1886. He adopted the career of diplomacy, and as member of embassies or ambassador for Saxony resided at Berlin, Paris, Munich, and Lon-

Beuthen

don. He was successively minister of foreign affairs and of the interior for Saxony. At the London conference regarding the Schleswig-Holstein difficulty he represented the German Bund. He lent his influence on the side of Austria against Prussia before the war of 1866, after which, finding his position in Saxony difficult, he entered the service of Austria as minister of foreign affairs, became president of the ministry, imperial chancellor, and in 1868 was created count. In 1871-78 he was ambassador in London, in 1878-82 in Paris.

Beuthen (boi'tn), a town in Prussian Silesia near the s. e. frontier, in the government of Oppeln; the center of a mining district. Manufactures of cloth and linens. Pop. 67,709.

Beveland (ba've-lant), NORTH and SOUTH, two islands in the estuary of the Scheldt, Netherlands, province of Zeeland; aggregate area estimated 120 sq. miles. South Beveland is very fertile, and has manufactures of salt, leather, beer, etc.

Beveridge (bev'er-ij), ALBERT J., legislator, born in Ohio in 1862. His family removed to Illinois after the Civil war, and he graduated at De Pauw University in 1885, and was afterwards admitted to the bar. A fluent and popular political orator, he was elected to the United States Senate from Indiana in 1899 and re-elected in 1905. He wrote *The Russian Advance* and *The Young Man and the World*.

Beveridge, JOHN L., soldier and governor, born in New York in 1824. He removed to the West in 1842, was a lawyer in Chicago after 1855, and served in the army throughout the Civil war, attaining the rank of brigadier-general. He was elected lieutenant-governor of Illinois in 1872 and governor in 1873. Died 1910.

Beveridge, KÜHNE, American sculptor, granddaughter of John L. Beveridge, born in 1877. Was a pupil of Rodin. Exhibited at New York, London, and at Paris where at the Paris Exposition in 1900 she obtained honorable mention.

Beveridge, WILLIAM, an English divine, born in 1637, was, after various ecclesiastical preferments, appointed Bishop of St. Asaph in 1704. He died at Westminster in 1708.

Beverley, a town of England, E. riding of Yorkshire, 10 miles N. N. W. of Hull, and 1 mile from the river Hull, with which it has canal connection; has a fine Gothic minster, in some respects unsurpassed. Pop. 13,654.

Beverley, JOHN OF, an English priest, and saint, born about middle of the seventh century at Ham, Yorkshire; appointed Abbot of Hilda; afterwards Bishop of Hexham in 685; and promoted to the bishopric of York in 705. He founded a college for secular priests at Beverley, where he retired in 717, and died in 721. Many cases of miraculous healing were attributed to him.

Beverley, ROBERT, American colonial historian, born in Virginia in 1875. While assistant in charge of Virginia colonial records, he wrote *History of Virginia*, the first of its kind by a native Virginian, and valuable to as a historical work dealing with Indians and contemporary affairs.

Beverly, a seaport of Essex Co., Massachusetts, 18 miles north-east of Boston; has a fine harbor and good fisheries. It is a summer resort, and has manufactures of shoes and shoe machinery, oiled clothing, belting, etc. In 1788 there was established here the first cotton mill to be successfully operated in the United States. It was the birthplace and early home of Lucy Larcom (1825-1893) and the scene of much of her *Story of a New England Girlhood*. Pop. 18,650.

Beverwijk a town in the province of North Holland, Netherlands, 8 miles N. of Haarlem. Pop. (1910) 6614.

Bevis of Hampton, the name of a medieval English metrical romance, is the story of the adventures of Bevis, son of Guy, earl of Hamtoun. The oldest extant version is an Anglo-Saxon text dating from the first half of the 13th century. In its various versions the story bears a close relation to the Hamlet legend as related by Saxo Grammaticus.

Bewick (bu'ik), THOMAS, a celebrated English wood engraver, born in Northumberland in 1753. He was apprenticed to Beilby, an engraver in Newcastle, and executed the woodcuts for Hutton's *Mensuration* so admirably that his master advised him to turn his attention to wood-engraving. With this view he proceeded to London, returning to Newcastle he entered into partnership with Beilby. He quite established his fame by the issue in 1790 of his *History of Quadrupeds* (text compiled by Beilby), the illustrations of which were superior to anything hitherto produced in the art of wood-engraving. In 1797 appeared the first and in 1804 the second volume of his *British Birds*, generally regarded as the finest of his works (text partly by Bewick). He died in 1828.

Bex (bâ), a village of Switzerland, canton Vaud, with salt works and warm sulphur baths now much frequented. Pop. 4600.

Bexhill, municipal borough and watering place in Sussex, England. Pop. 12,213.

Bexley, town in parliamentary division of Dartford, Kent, England. It is mentioned in Domesday Book, and has had a church since the 9th century. Pop. 12,918.

Beyle. See *Beg*.

Beyle (bâl), MARIE HENRI, a French author widely known by his pseudonym *de Stendhal*; born at Grenoble in 1783; held civil and military appointments under the empire; took part in the Russian campaign of 1812, thence until 1821 lived at Milan, chiefly occupied with works on music and painting. After nine years' residence at Paris he became consul at Civita Vecchia. In 1841 he returned to Paris, and died in 1842. The distinguishing feature of his works was the application of acutely analytic faculties to sentiment in all its varieties, his best books, *Le Rouge et le Noir*, 1831; and *La Chartreuse de Parme*, 1839.

Beyrout (bi-rût'), or BEIRUT (ancient *Berytus*), the chief seaport of Syria, an ancient Phœnician city, 90 m. N. W. of Damascus; pop. estimated at 120,000 to 140,000, largely Christians. It stands on a tongue of land projecting into an open bay and backed by the Lebanon range, and has rapidly increased since 1835, mainly owing to the extension of the silk trade, of which it is the center. Its other chief exports are olive-oil, cereals, sesame, tobacco, and wool; manufactures are silk and cotton. The old town has narrow, dirty streets, very different from the new with its modern houses, hotels, churches, colleges and schools, gardens and carriage drives. It is intimately connected with the history of the Druses. It was bombarded and taken by the British in 1840.

Beza (properly, *de Bèze*), THEODORE, next to Calvin the most distinguished man in the early reformed church of Geneva; born of a noble family at Vezelay, Burgundy, 1519; educated in Orleans under Melchior Volmar, a German scholar devoted to the Reformation; in 1539 became a licentiate of law, and went to reside at Paris. His habits at this time were dissipated, and his *Poemata Juvenilia*, Latin verses of a more than Ovidian freedom, were afterwards a frequent ground of attack upon him. The

reforming influence of a severe illness led in 1548 to his retirement to Geneva and his marriage with his mistress. In 1549 he became professor of Greek at Lausanne, occupying himself with the completion of Marot's translation of the Psalms and the study of the New Testament, and corresponding frequently with Calvin. In 1558 he was sent by the Swiss Calvinists on an embassy to obtain the intercession of the Protestant princes of Germany for the release of Huguenots imprisoned in Paris. In the following year he went to Geneva as a preacher, and soon after became a professor of theology, and the most active assistant of Calvin. He also rendered admirable service to the cause of the reformers at the court of the King of Navarre and in attendance upon Condé and Coligny. At Calvin's death in 1564 the administration of the Genevese Church fell entirely to his care. He presided in the synods of the French Calvinists at La Rochelle (1571) and at Nismes (1572); was sent by Condé (1574) to the court of the elector palatine; and at the religious conference at Montpellier (1586) opposed James Andreas and the theologians of Würtemberg. At the age of sixty-nine he married his second wife (1588), and in 1597 wrote a lively poetical refutation of the rumor that he had recanted and was dead. In 1600 he resigned his official functions, and he died in retirement in 1605. Among his many works, his *History of Calvinism in France from 1521 to 1563*, and *Theological Treatises*, are still esteemed; but he is most famous for his Latin translation of the New Testament.

Bezant (ber'ant, bē-zant'), originally a Byzantine gold coin, which had a wide circulation throughout Europe up to about 1250. Its average value was about \$2. They are frequently employed as a heraldic charge, a custom supposed to have been introduced by the Crusaders.

Bezdan, town in Bacs-Bodrog, Hungary, on the Danube. Pop. 8000.

Béziers (bā-zyâr; anc. *Beterræ*), a town in Southern France, dep. Hérault, beautifully situated on a height and surrounded by old walls, its chief edifices being the church of St. Nizaire, a Gothic structure dating from the 12th to the 14th centuries, crowning the height on which the town stands. Manufactures: woollens, hosiery, liqueurs, chemicals, etc., with a good trade in spirits, wool, grain, oil, verdigris, and fruits. It was an important place in the Roman period and in the Middle Ages, and in 1209 was the

scene of a horrible massacre of the Albigenses. Pop. (1906) 46,262.

Bezique (be-zék'), a simple game of cards most commonly played by two persons with two packs. The now widely played game of pinochle is based upon and closely resembles it.

Bezoar (bē'zōr), a concretion or calculus, of a roundish or ovate form, met with in the stomach or intestines of certain animals, especially ruminants. Nine varieties of bezoars have been enumerated, broadly divisible into those which consist mainly of mineral and those which consist of organic matter. The true oriental bezoars, obtained from the gazelle, belong to the second class. They are formed by accretion round some foreign substance, a bit of wood, straw, hair, etc., and were formerly regarded as efficacious in preventing infection and the effects of poison.

Bezwada (bes-wā'da), town in British India, Madras Presidency. Pop. 24,224.

Bhagalpur (bhā-gal-pūr'), a city in Bengal, capital of a district and division of the same name, on the right bank of the Ganges, here seven miles wide. It has remarkable Jain temples and is the seat of a large trade. There are several indigo works in the neighborhood. Pop. 75,760.—The division of Bhagalpur has an area of 19,776 sq. miles, and a pop. (chiefly Hindus, and Mohammedans) of 8,091,405.

Bhamo (b'hā-mō'), a town of Burmah on the Upper Irrawaddy, about 40 miles from the Chinese frontier. It is the starting-point of caravans to Yunnan, and is in position to become one of the great emporiums of the East in event of a regular overland trade being established between India and West China. Pop. (1901) 10,734, consisting of Chinese and Shans.

Bhandara (bhan-dā'ra), a town of India, Central Provinces, with manufactures of hardware and cottons. Pop. 14,023.

Bhang. See *Hashish*.

Bhanpura (bān-pū'rā), a walled town of Central India, in Indore state, on the Rewa, 60 miles s. of Kotah. Pop. 20,000.

Bhartpur. See *Bhurtpore*.

Bhartrihari (bar'tri-ha'ri), an Indian poet, reputed author of a book of apophthegms, according to legend a dissolute brother of King Vikramāditya (first century B. C.), who became a hermit and ascetic. The collection of 300 apophthegms bearing his name is, however, probably an anthology.

Bhatgaon (bhat-gā'on), a town in Nepal, about 8 miles from Khatmandu. Pop. about 30,000.

Bhanu Daji (bou-dā'ji), an Indian physician and antiquarian, born in Manjare, Bombay, India, 1822. Graduating in medicine at the Grant Medical Colleges in 1850, he became assistant professor there. He carried on some valuable research work in the study of leprosy, and made a large collection of rare Sanskrit manuscripts, died 1874.

Bhaunagar (bou-nug'ar), chief town and part of the state of the same name, Kathiawar peninsula, Bombay, India. Cotton is the chief export. Pop. (1901) 56,442. The area of the state is 2860 sq. miles, and it has a population of about half a million.

Bhavabhuti (bav-a-bū'ti), a celebrated Indian dramatist of the 7th and 8th centuries. He wrote three plays, which have come down to us. The history of Rama forms the subject of the latter two.

Bhavani-Kudal, a town in Madras Presidency, India, 40 miles w. by s. of Salem; has famous temples erected to Vishnu and Siva. Pop. 10,000.

Bheels, or **BHILS** (bēls, bils), a Dravidic race inhabiting in scattered fashion a great part of India, a relic of the Indian aborigines driven from the plains by the Aryan Rajputs. They appear to have been orderly and industrious under the Delhi emperors; but on the transfer of the power in the eighteenth century from the Moguls to the Marathas they asserted their independence, and being treated as outlaws took to the hills. Various attempts to subdue them were made by the Gackwar and by the British in 1818 without success. A body of them was, however, subsequently reclaimed, and a Bheel corps formed, which stormed the retreats of the rest of the race and reduced them to comparative order. The hill Bheels wear little clothing, and live precariously on grain, wild roots and fruits, vermin, etc., but the lowland Bheels are in many respects Hinduized. They number about one and a half million.

Bhel. See *Bel*.

Bhera (bē'ra), a town of British India, in the Shahpur district of the Punjab, situated on the river Jhelum. Pop. 18,680.

Bhilsa, **BILSA** (bil'sā), a town of India, in the state of Gwalior, on the right bank of the Betwa. It has a fort and well-built suburb, but is chiefly interesting on account of the Buddhist topes in the neighborhood, those at Sanchi

near Bhilisa being especially worthy of note.

Bholan Pass. See *Bolan Pass*.

Bhoj. See *Bhuj*.

Bhopal (bho-pū'), a native state of Central India under British protection, on the Nerbudda, in Malwah. Area 6802 sq. miles. The country is full of jungles, and is traversed by a part of the Vindhya Mts. The soil is fertile, yielding wheat, maize, millet, pease, and the other vegetable productions of Central India. Chief exports: sugar, tobacco, ginger, and cotton. The district is well watered by the Nerbudda, Betwa, and minor streams. Pop. 685,961.—The capital of above state, also called Bhopal, has a population of 76,561, and has an abundant water-supply in two fine artificial lakes near the town.

Bhuj (bhūj), chief town of Cutch in India, Bombay Presidency, at the base of a fortified hill, with military cantonments, high school and school of art, mausoleums of the Raos or chiefs of Cutch, etc. Pop. (1901) 26,362.

Bhurtpore, or BHARTPUR', a native state of India, in Rajputana, bounded E. by Agra, S. and W. by the Rajput States. Area, 1961 sq. miles. The surface is generally low, and the state is scantily supplied with water; soil generally light and sandy; chief productions: corn, cotton, and sugar. The country is also known as Brij, and is the only Jāt state of any size in India. Under British protection since 1826. Pop. 626,000.—The capital, which has the same name, is a fortified place, and was formerly of great strength, Lord Lake being compelled to raise the siege in 1805 after losing 3100 men. It was taken by Lord Combermere in 1827. The rajah's palace is a large building of red and yellow freestone presenting a picturesque appearance. Pop. 43,000.

Bhutan (bhu-tān'), an independent state in the Eastern Himalayas, with an area of about 16,800 sq. miles, lying between Tibet on the N. and Assam and the Jalpaiguri district on the S., and consisting of rugged and lofty mountains, abounding in sublime and picturesque scenery. Pop. est. at about 200,000. The Bhutanese are a backward race, governed by a *Dharm Rajah*, regarded as an incarnation of deity, and by a *Deb Rajah*, with a council (*Lenchen*). They are nominally Buddhists. After various aggressive incursions and the capture and ill treatment of Mr. Ashley Eden, the British envoy, in 1863, they were compelled to cede to the British

considerable portions of territory, in return for a yearly allowance of £2500.

Biafra (bē-af'ra), BIGHT OF, an African bay running in from the Gulf of Guinea, having the Cameroon Mountains at its inner angle, and containing the island of Fernando Po.

Bialystok (be-ā'l'is-tok), or BJEŁOSTOK, town, Russian Poland, province of Grodno; well built, with a palace formerly belonging to the Counts Braniski, and known as the 'Polish Versailles.' Pop. 64,000.

Biana (be-ā'nā), a town of India, Bhurtpore, an old place with many temples, venerated by Mohammedans. Pop. 10,000.

Biancavilla (be-ān-kā-vil'ā), a town of Sicily on the southern side of Etna. Has cotton manufactures. Pop. 12,760.

Bianchini (be-ān-kō'nē), FRANCESCO, an Italian historian and astronomer, born in 1662. He was librarian to Cardinal Ottoboni, who on becoming pope, as Alexander VIII, raised him to the office of papal chamberlain; and Clement XI appointed him secretary to the commission for the correction of the calendar, and employed him to form a museum of Christian antiquities; left a portion of a *Universal History* and works on the planet Venus, and posthumously *Astronomicæ et Geographicæ Observationes Selectæ* (1737) and *Opuscula Varia* (1754). He died in 1729.

Biard (bē-ār), AUGUSTE FRANÇOIS, a French genre painter, born in 1798; died in 1882. He traveled extensively, visiting Spain, Greece, Syria, Egypt, Mexico, Brazil, etc. Among his best known pictures have been the *Babes in the Wood* (1828); the *Beggar's Family* (1836); the *Combat with Polar Bears* (1839); and the *Strolling Players*, now in the Luxembourg. A strong element of caricature runs through most of his works.

Biarritz (be-ar-ritz'), a small seaport of France, Basses-Pyrénées, near Bayonne. It became a fashionable watering-place during the reign of Napoleon III, who had an autumn residence there. Pop. 13,629.

Bias (bi'as), one of the seven sages of Greece, born at Priene, in Ionia; flourished about 570 B.C. He appears to have been in repute as a political and legal adviser, and many sayings of practical wisdom attributed to him are preserved by Diogenes Laertius.

Bias (bi-ās'), one of the five large rivers of the Punjab, India, rising in the Himalayas (13,326 ft.), and flowing first in a westerly and then in a

southerly direction until it unites with the Sulej after a course of 300 miles.

Bib, a fish of the cod family (*Gadus luscus*), found in the British seas, about a foot long, the body very deep, esteemed as excellent eating. It is called also *pout* or *whiting pout*.

Biberach (bē'be-rāh), a town of Würtemberg, Germany, on the Riss, formerly a free imperial city. It is an active fruit market. The French, under Moreau, defeated the Austrians near Biberach in 1796. Pop. 8390.

Bible (bī'bl; Greek *bibloi*, books, from *biblos*, the inner bark of the papyrus, on which the ancients wrote), the collection of the Sacred Writings or Holy Scriptures of the Christians. Its two main divisions, one received by both Jews and Christians, the other by Christians only, are improperly termed Testaments, owing to the confusion of two meanings of the Greek word *diathēkē*, which was applied indifferently to a covenant and to a last will or testament. The Jewish religion being represented as a compact between God and the Jews, the Christian religion was regarded as a new compact between God and the human race; and the Bible is, therefore, properly divisible into the Writings of the Old and New Covenants. The books of the Old Testament received by the Jews were divided by them into three classes: 1. The Law, contained in the Pentateuch or five books of Moses. 2. The Prophets, comprising Joshua, Judges, I and II Samuel, I and II Kings, Isaiah, Jeremiah, Ezekiel, and the twelve minor prophets. 3. The Kethubim, or Hagiographa (*holy writings*), containing the Psalms, the Proverbs, and Job, in one division; Ruth, Lamentations, Ecclesiastes, Esther, and the Song of Solomon, in another division; Daniel, Ezra, Nehemiah, and I and II Chronicles, in a third. These books are extant in the Hebrew language; others, rejected from the canon as apocryphal by Protestants, are found only in Greek or Latin.

The books of Moses were deposited, according to the Bible, in the tabernacle, near the ark, the other sacred writings being similarly preserved. They were removed by Solomon to the temple, and on the capture of Jerusalem by Nebuchadnezzar probably perished. According to Jewish tradition, Ezra, with the assistance of the great synagogue, collected and compared as many copies as could be found, and from this collation an edition of the whole was prepared, with the exception of the writings of Ezra, Malachi, and Nehemiah, added subsequently, and certain obviously later insertions in other books.

The exact date of the determination of the Hebrew canon is uncertain. Between the last of the Old Testament writings (the canonical scriptures) and the rise of the New Testament there ensued a period of about one hundred and fifty years. Nevertheless, the literary spirit of the Jewish people did not rest during this time, but spent itself in producing works that bore an intimate relation to the Jewish history and sentiment. These writings were never invested by the stricter Jews with canonical dignity, one reason being perhaps that they were mainly written in Greek. The Hellenistic or Alexandrian Jews, however, were less strict, and admitted many of these later writings, forming what is now known as the *Apocrypha*, in which they were followed by the Latin Church. The Greek fathers, as also Augustine, seem to draw but a slight distinction between these apocryphal writings and the accepted Scriptures, and the Council of Trent gave them a position equal with the canonical writings of the Old Testament; but the Protestant churches at the Reformation gave their adherence to the restricted Hebrew canon, though the *Apocrypha* was long included in the various editions of the Bible. The New Testament is a collection of twenty-seven distinct writings, which have been divided as Historical, numbering five; Didactic, twenty-one; and Prophetical, one; the writings of the first division including more than half of the entire collection.

The earliest and most famous version of the Old Testament is the *Septuagint*, or Greek translation, executed by Alexandrian Greeks, and completed probably before 130 B.C., different portions being done at different times. This version was adopted by the early Christian church and by the Jews themselves, and has always held an important place in regard to the interpretation and history of the Bible. The Syriac version, the *Peshito*, made early in the second century after Christ, is celebrated for its fidelity. The Coptic version was made from Greek MSS. in the third or fourth century. The Gothic version, by Ulfilas, was made from the *Septuagint* in the fourth century, but mere insignificant fragments of it are extant. The most important Latin version is the *Vulgate*, executed by Jerome, partly on the basis of the original Hebrew.

The *Apocrypha*, or non-canonical books are fourteen in number and include First (Third) Esdras, Second (or Fourth) Esdras, Tobit, Judas, the parts of Esther not found in Hebrew or Chaldee, the Wisdom of Solomon, the Wisdom of Jesus, son of Sirach, Baruch; the Song of the Holy Children, the

History of Susanna, Bel and the Dragon, The Prayer of Manasses (Manasseh) 1 and 2 Maccabees. All these are found in the Septuagint, were read as parts of the Sacred Scriptures by all Jews outside of Palestine; were accepted by the early Christians, were translated by Jerome as parts of his Latin Bible, the *Vulgate*, and to this day are regarded as Biblical by the Roman Catholic Church. The Protestant churches limit the Old Testament to the thirty-nine books originally written in Hebrew. Yet in the rubric of the Church of England at certain seasons are lessons from the Apocrypha. The use of this word Apocrypha with the reference of the word to these books, is found only among Protestant writers.

By 'the canon of Scripture,' or 'the canonical Books' (from the Greek word *canon*, 'a rule'), is meant those books which are looked upon as inspired and containing the standards for faith and conduct. That this opinion of the Old Testament books should become dominant among the Jews was a natural result of their origin, most of the books having been written, supposedly, by prophets who were recognized as inspired men. The Jews have always regarded Ezra (450 B.C.) as the scribe who gathered the scattered copies of the ancient writings, brought them together, and thereby framed the sacred canon. This cannot now be proved; but the prominence of Ezra in Jewish tradition, and the honor given to his memory as after Moses 'the second founder of Israel,' indicate that Ezra had some part in the collocation and selection of the Scriptures. In the opinion of the Palestinian Jews the canon was closed soon after the time of Ezra. But it is evident that some portions were added later, as the lists of high-priests in Nehemiah 12, going down to Jaddua, who ruled 330 B.C., some parts of Daniel which refer to events as late as 165 B.C., and Psalm 74, which undoubtedly refers to the terrible persecution of the Jews by the Syrians, 170 B.C. It is evident that the Hebrew Bible about 100 B.C. embraced the same books as we find in the Old Testament of our English Bible. According to the Hellenistic or Grecian Jews, who included the Apocrypha, the canon was not closed until 130 B.C. or even later. In every synagogue throughout the Jewish world, the Scriptures were read, from the Law, the Prophets, and the Psalms. This required a constant supply of written copies, especially as the volumes or rolls were laid aside as soon as they showed signs of wear. They were generally handed over to the schoolmaster, who held during the

week, 'the Vineyard,' which was their name for the boys' school. When entirely worn out, the copies of the Scriptures were either buried or burned, a regular funeral service being held. This fact explains how it is that no very ancient copies of the Hebrew Bible are now in existence, the earliest, it is said, belonging to the seventh century A.D.

The printed editions of the Hebrew Bible are very numerous. The first edition of the entire Hebrew Bible was printed at Soncino in 1488. The editions of Athias (1661 and 1667) are much esteemed for their beauty and correctness. Van der Hooght followed the latter. Dr. Benjamin Kennicott did more than any one of his predecessors to settle the Hebrew text. His Hebrew Bible appeared at Oxford in 1776-80, two vols. folio. The text is from that of Van der Hooght, with which 630 MSS. were collated. De Rossi, who published a supplement to Kennicott's edition (Parma, 1784-99, five vols. 4to), collated 958 MSS. The German Orientalists, Gesenius, De Wette, and others, in recent times, have done very much toward correcting the Hebrew text.

As the Christian religion began among the Jews, and for nearly a generation was largely Jewish in its membership, the Old Testament was held in the same honor and authority in the church as it had been held in the synagogue. With it began to be read the gospels and epistles of the New Testament as soon as these were circulated among the churches. Although there was no New Testament Apocrypha corresponding to that of the Old Testament, some books were slow in recognition and acceptance, as II Peter, Jude, Hebrews and Revelation; while in some churches, 'The Shepherd of Hermas' and a few other books not in our New Testament were read. But by gradual use and common consent the twenty-seven books constituting the New Testament came to be recognized as Scripture, and the decrees of the councils later, beginning with that of Laodicea, in 363 A.D., simply confirmed the general usage. Whoever will take the trouble to examine the books of the 'New Testament Apocrypha'—not an ancient but a modern collocation—will readily understand why these early writings were soon dropped from the list of the New Testament canon. All the books of the New Testament were written in Greek, except possibly the Gospel by Matthew, which may have been originally written in Aramaic, the common tongue of Palestinian Jews. The Greek of the New Testament is not that of the old classic writings, the language of Plato

and Sophocles, but a later, Hellenistic Greek, such as was spoken throughout the eastern world in the first century A. D. The three oldest manuscripts of the New Testament known to be in existence are (1) the Sinaitic MS., discovered by Tischendorf in a convent on Mount Sinai in 1844, assigned to the middle of the fourth century; (2) the Vatican MS. at Rome, of similar date; (3) the Alexandrine MS. in the British Museum, assigned to the middle of the fifth century. Each MS. contains also the Septuagint Greek of the Old Testament in great part. The Vulgate of Jerome embraces a Latin translation of the New as well as of the Old Testament, based on an older Latin version. The division of the text of the New Testament into chapters and verses was introduced later than that of the Old Testament; but it is not precisely known when or by whom. The Greek text was first printed in the *Complutensian Polyglot*, in 1514; in 1516 an edition of it was published at Basel by Erasmus. Among recent valuable editions are those of Lachmann, Tischendorf, Tregelles, Westcott and Hort, and Souter.

The earliest translation of the Bible was, as we have seen, the Septuagint or Greek version of the Old Testament, made by Hellenistic Jews of Alexandria, and completed about 130 B. C. In Palestine it was regarded with great disfavor; and the Jews of Jerusalem long held a service of fasting, humiliation and prayer, on the anniversary of the day when the Scriptures began to be read in 'the tongue of the heathen.' But this dislike did not prevent the Septuagint from becoming the Jewish Bible in all the lands except Palestine. It is noteworthy, that nearly all the quotations from the Old Testament in the New, are taken from the Septuagint; for that version was adopted by the Christian churches wherever Greek was spoken.

Another series of translations of the Old Testament books were the *Targums* (Hebrew *targumim*, 'interpretations'). These were the renderings from the ancient Hebrews to the vernacular Aramaic given in the synagogues by the *methargamim* or official translators. They were spoken from the memory only, and not written down for centuries after their composition. The earliest of these now in existence is the Targum of Onkelos, perhaps written as early as the first or second century A. D., a translation of the Pentateuch or books of the Law. Other Targums on different parts of the Old Testament are those named the Jerusalem Targum (Pentateuch), the Targum of Jonathan (Prophets), and Tar-

gums on the Psalms, Wisdom books, and on all the Old Testament except Ezra, Nehemiah and Daniel.

The most important of all the translations made in the early Christian church is that of Jerome (completed 405 A. D.) and embracing both the Old and New Testaments, including the Apocrypha, in the Latin language, known as the *Vulgate*, or 'common' version, as Latin was the current speech of all the lands west of Rome, including north Africa. This became the standard Bible of the church was the only Bible in use during the Middle Ages, and remains to this day the version accepted by the Roman Catholic Church.

Of translations of the Bible into modern languages the English and the German are the most celebrated. Considerable portions were translated into Anglo-Saxon, including the Gospels and the Psalter. John Wycliffe's translation of the whole Bible (from the *Vulgate*), begun about 1356, was completed shortly before his death, which took place in 1384. The first printed version of the Bible in English was the translation of William Tyndall or Tyndale, whose New Testament was printed in quarto at Cologne in 1525, and soon afterward in octavo at Worms. The Pentateuch was published by Tyndale in 1530, and afterward some of the prophetic books. Our Authorized Version in the New Testament has embodied much of Tyndall's work, and owes more to him than to any other translator. A translation of the entire Bible, from German and Latin versions was published in 1535 by Miles Coverdale, an Augustinian friar; but it is inferior to Tyndall's. In 1539 appeared 'the Great Bible,' the first printed in England by royal authority, and ordered to be placed in every parish church. It was edited by Thomas Cranmer, Archbishop of Canterbury under Henry VIII. In 1557-1560 an edition appeared at Geneva, based on Tyndall's, the work of Whittingham, Gilby and other exiles, called the Geneva Bible. This became the Bible of the Puritans, and was for sixty years the most popular in England. It was the first printed in Roman letters, the first divided into verses, and the first to give words not in the original in italics. The Bishop's Bible (1568-1572) was based on Cranmer's, prepared by eight bishops of the Church of England, under the supervision of Archbishop Parker. Although authorized, it did not commend itself to scholars or the people. In 1582, an edition of the New Testament, translated by Roman Catholic scholars from the Latin Vulgate, appeared at Rheims, and is

1609-1610 the Old Testament was published at Douay. This is the Douay Bible, endorsed and circulated by the Roman Catholic Church.

In the reign of James I, a new translation was undertaken by forty-seven scholars. The revision was begun in 1607, and occupied three years, the completed work being published in folio in 1611. By the general accuracy of its translation and the purity of its style it superseded all other versions. This is the Authorized Version still in common use. After two hundred and fifty years of publication, a desire for a revision arose, and in 1870 the Convocation of Canterbury appointed a committee to consider the question of a new version. Upon the recommendation of this committee, companies were formed for the translation of the Old and New Testaments; and two similar companies were organized in America to aid them. The Revised Version of the New Testament appeared in 1881, of the Old Testament in 1884, not a new translation, but a revision of the Authorized Version, with comparatively few changes. The American Revisers had urged more extensive alterations, and in 1901 published the American Standard Version, embodying their judgment of a correct English text, now widely used in America, and to some extent in Great Britain.

In German, the most important version was that of Luther, of which the New Testament appeared in 1522, the Old Testament in 1534.

Bible Christians, a small sect founded by a Cornish Methodist preacher called O'Bryan, who profess to follow only the doctrines of the Bible and reject all human authority in religion. Now merged in the United Methodist Church.

Bible Communists. See *Perfectionists*.

Bible Publishing. The copyright of the Bible is in Great Britain vested in the Crown, but in the United States the government exercises no control over the publication. Until about 1880 most of the Bibles were imported from England but Bible publishing now gives employment to many printers and binders, and the work turned out by them is unsurpassed in any other country. Most of the trade is done in two styles—cloth and flexible leather with turned-over edges ('divinity circuit').

Bible Societies, societies formed for the distribution of the Bible or portions of it in various languages, either gratuitously or at a low rate. A clergyman of Wales, whom the

want of a Welsh Bible led to London, occasioned the establishment of the British and Foreign Bible Society, March 7 1804. A large number of similar institutions were soon formed in all parts of Great Britain, and afterwards on the Continent of Europe, in Asia and in America, and connected with the British as a parent or kindred society. Since the formation of the British and Foreign Bible Society it has circulated numerous versions or the whole or parts of the Scriptures in 400 different languages. More than half of the expenditure of their society has been devoted to the diffusion of the Authorized Version of the Bible, which by one of its original laws was the only one it was permitted to circulate. In 1901 this law was widened to include the Revised Version. The total issues to 1910 were about 226,000,000 copies, while many other millions have been distributed by the kindred societies which have sprung out of it. The Edinburgh Bible Society established in 1809, and up to 1826 connected with the British and Foreign Bible Society, seceded on the occasion of a controversy regarding the circulation of the Apocrypha, and up to 1860 existed as a separate society. In 1861 this society was united with the National, the Glasgow, and other Bible societies, into a whole called the National Bible Society of Scotland, having its headquarters in Edinburgh and Glasgow. The Hibernian Bible Society, which has its headquarters in Dublin, was established in 1806, to encourage a wider circulation of the Bible in Ireland. In Germany the principal Bible society is the Prussian, established at Berlin in 1805 and having many auxiliaries. France has two principal Bible Societies, whose headquarters are at Paris, the one instituted in 1818, the other in 1833. Switzerland possesses various Bible societies, chief among which are those of Basel (1804), Bern, Lausanne, and Geneva. In the Netherlands there has existed since 1815 a fraternal union of different sects for the distribution of Bibles. The Swedish Bible Society was instituted in 1814, and the Norwegian Bible Society in 1816. The first Russian Society in St. Petersburg printed the Bible in thirty-one languages and dialects spoken in the Russian dominions, and auxiliary societies were formed at Irkutsk, Tobolsk, among the Kirghises, Georgians, and Cossacks of the Don; but they were all suppressed by an imperial ukase in 1826. In the United States the great American Bible Society, formed in 1816, acts in concert with auxiliary societies in all parts of the Union, and issues annually over 2,000,000 volumes. Its total issue since its organization amounts to nearly 90,000,000. This includes Bibles

in many foreign tongues and the languages of several Indian tribes. The first such translation was made by John Eliot, the 'Apostle of the Indians' (1661-63), into the language of the Indians of Massachusetts.

Biblia Pau'perum ('Bible of the poor'), the name for block-books common in the middle ages, and consisting of a number of rude pictures of Biblical subjects with short explanatory text accompanying each picture.

Bibliography (bib-li-og'ra-fi; Gr. *biblion*, a book, and *grapho*, I describe), the knowledge of books, in reference to the subjects discussed in them, their different degrees of rarity, curiosity, reputed and real value, the materials of which they are composed, and the rank which they ought to hold in the classification of a library. The subject is sometimes divided into *general*, *national*, and *special* bibliography, according as it deals with books in general, with those of a particular country, or with those on special subjects or having a special character (as early printed books, anonymous books). A subdivision of each of these might be made into *material* and *literary*, according as books were viewed in regard to their mere externals or in regard to their contents.

Hardly any branch or department of bibliography has as yet been quite adequately treated. The reduction of bibliographic material to something like method and system was undoubtedly the work of France. Brunet's *Manuel du Libraire*, containing, in an alphabetical form, a list of the most valuable and costly books of all literatures; Barbier's *Dictionnaire des Ouvrages Anonymes*; Renouard's *Catalogue d'un Amateur*, for a long time the best guide of French collectors; and the *Bibliographie de la France*, recording the yearly accumulation of literary works, were all first works in their respective departments. The authors of anonymous and pseudonymous works are made known in Barbier's *Dictionnaire des Ouvrages Anonymes et Pseudonymes* (Paris, 1806-9), treating only of French and Latin works; Quérard's *Dictionnaire des Ouvrages Pseudonymes et Anonymes de la Littérature Française* (Paris, 1854-56), and his *Supercherie Littéraires Dévoilées* ('Literary Frauds Unveiled,' Paris, 1845-56). Lorenz's *Catalogue Général de la Librairie Française* (1867-87), include the important French bibliographical books of the nineteenth century.

The beginnings of English bibliography are to be found in Blount's *Censura Celebriorum Auctorum* (1690), and Oldys' *British Librarian* (1737). Among library catalogues of which it can boast are those of the Bodleian Library, the British Museum (only partly printed), and the Advocates' Library, Edinburgh. Catalogues compiled on a scientific system, by which the reader is assisted in his researches after books on a particular subject are not uncommon on the European continent; but the only extensive one of the kind in Britain is that of the Signet Library, Edinburgh. A valuable classified catalogue, so far as it goes, is Sonnenschein's *The Best Books*, a guide to about 25,000 modern works on all subjects. Of other English bibliographical works we may mention the *Typographical Antiquities* of Ames, Herbert, and Dibdin; Brydges' *Censura Literaria* (1805); Dibdin's *Bibliographical Decameron* (1817); Dr. Robert Watt's *Bibliotheca Britannica* (1824, 4 vols., two of subjects and two of authors); Lowndes' *Bibliographer's Manual*, edited by H. C. Bohn, 1869; S. A. Allibone's *Critical Dictionary of English Literature and British and American Authors* (1859-71), etc. The bulky booksellers' catalogues of Bohn and Quaritch, Low's English catalogue of books published from 1835 onwards, in continuation of the London catalogue giving all English books published from 1700; and the *Reference Catalogue of Current Literature* are also valuable bibliographical works. The *Dictionary of the Anonymous and Pseudonymous Literature of Great Britain* by Halkett and Laing (4 vols., 1822-88) is of high value. American literature has already given rise to a series of bibliographical works on both sides of the Atlantic, e.g. Ternaux-Compans's *Bibliothèque Américaine*, 1837; Rich's *Bibliotheca Americana Nova*, giving books published between 1700 and 1844; *Bibliographical Catalogue of Books, Translations of the Scriptures, and other Publications in the Indian Tongues of the United States*, 1849; Duyckinck's *Cyclopedia of American Literature*, 1856; Trübner's *Bibliographical Guide to American Literature*, 1856; and the *General American Catalogue* compiled by Lynde E. Jones and F. Leypoldt, 1880, with works of more recent date.

Of German bibliographical works we shall only mention Heinsius's *Allgemeines Bücherlexikon*, giving books published between 1700 and 1888, and Keyser's *Vollständiges Bücherlexikon*, giving books published between 1750 and 1888. German bibliography is particularly

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rich in the literature of separate sciences; and the bibliography of the classics and of ancient editions was founded by the Germans. See also *Bibliomania*.

Bibliomanacy (bib'li-o-man-si), divination performed by means of books, and especially of the Bible; also called *sortes biblicæ* or *sortes sanctorum*. It consisted in taking passages at hazard, and drawing indications thence concerning things future, in the same way that the ancients drew prognostications from the works of Homer and Virgil. In 1465 the Council of Vannes condemned the practice, as did the Councils of Agde and Orleans.

Bibliomania (bib-li-o-mā'ni-a, 'book madness'), a passion for possessing curious books. The true bibliomanist is determined in the purchase of books less by the value of their contents than by certain accidental circumstances attending them, as that they belong to particular classes, are made of singular materials, or have something remarkable in their history. One of the most common forms of the passion is the desire to possess complete sets of works, as of the various editions of the Bible or of single classics; of the editions in *usum Delphini* and *cum notis variorum*; of the Italian classics printed by the Academy *della Crusca*; of the works printed by the Elzevirs or by Aldus. Scarce books, prohibited books, and books distinguished for remarkable errors or mutilations have also been eagerly sought for, together with those printed in the infancy of typography, called *incunabula*, first printed editions (*editiones principes*) and the like. Other works are valued for their miniatures and illuminated initial letters, or as being printed upon vellum, upon paper of uncommon materials, upon various substitutes for paper, or upon colored paper, in colored inks, or in letters of gold or silver. In high esteem among bibliomanists are works printed on large paper, with very wide margins, especially if uncut, also works printed from copper plates, *éditions de luxe*, and limited issues generally. Bibliomania often extends to the binding. In France the bindings of Derome and Padeloup are most valued; in England those of Charles Lewis and Roger Payne. Many devices have been adopted to give a factitious value to bindings. Jeffery, a London bookseller, had Fox's History of King James II bound in fox-skin; and books have been more than once bound in human skin. The edges of books are often ornamented with paintings, etc., and marginal decoration is frequently an element of considerable value. Another method of gratifying the bibliomaniac taste is that of en-

riching works by the addition of engravings—illustrative of the text of the book—and of preparing only single copies.

Bibracte, ancient Gaulish town, the capital of Ædui in the time of Cæsar. Excavation on a hilltop 2500 ft. above sea-level has uncovered an area of 230 acres surrounded by a stone and wood rampart 3 miles long, containing remains of dwellings, a temple of Bibractis and workshops of iron and bronze workers and enamelers.

Bibulus, MARCUS CALPURNIUS, consul with Julius Cæsar, 59 B.C. For his opposition to the policy of Cæsar he suffered ill treatment by the mob, and shut himself up in his house, taking no part in the proceedings of public business, whence arose the jest that Julius and Cæsar were consuls that year. He died about the year 32.

Bicarbonate (bi-kâr'bo-nât), a carbonate derived from carbonic acid (H_2CO_3) by replacing one of the atoms of hydrogen by a metal. Bicarbonate of sodium ($NaHCO_3$) is used as an antacid, and effervescing liquors are usually produced by mixing it with tartaric acid. It is also the chief ingredient of baking-powder.

Biceps (bi'seps), in anatomy the term applied to two muscles, one belonging to the arm, the other to the leg, and known respectively as the *biceps flexor cubiti* and the *biceps flexor cruris*. The former is the muscle which gives a full appearance to the front of the upper arm; the latter is situated on the back of the thigh, and is one of a group of three muscles known as 'hamstrings.'

Bicêtre (bê-sâtr), a village of France, s. w. of Paris, with a famous hospital for old men and an asylum for lunatics. Founded by Louis IX as a Carthusian monastery, it was rebuilt by Louis XIII as a hospital for old soldiers.

Bichat (bê-shâ), MARIE FRANÇOIS XAVIER, a French anatomist and physiologist, born at Tholrette in 1771; died in 1802. He wrote *Traité sur les Membranes*, which was translated into almost all the languages of Europe, *Recherches sur la Vie et la Mort*, and *Anatomie Générale*.

Bickerstaffe (bik'er-staf), ISAAC, a dramatic writer, born in Ireland about 1735; died in obscurity on the continent about 1812. Some of his best-known plays are *Maid of the Mill*, *He Would if He Could*, *Love in a Village*.—In English literature the name Isaac Bickerstaffe occurs as the name assumed by Swift in his controversy with Partridge, the almanac maker, and also as the pseudonym of Steele as editor of the *Tatler*.

Bickersteth (bik'er-steth), EDWARD, a clergyman of the Church of England, born in 1786; died in 1850. He took orders and became rector of Watton in Hertford. He was one of the founders of the Evangelical Alliance.

Bickerton, SIR RICHARD HUSSEY, an English admiral, born 1759; died 1832. He was captain of the 'Invincible' in the action off Martinique in 1781. In 1804 served as second in command to Lord Nelson in the Mediterranean. He was given the rank of admiral in 1810.

Bickmore, ALBERT SMITH, naturalist, born at St. George, Maine, in 1839. He graduated at Dartmouth in 1860. Studied under Agassiz, and traveled in the East, publishing in 1869 *Travels in the East Indian Archipelago*. He became professor of natural science in Madison University and superintendent of the Museum of Natural History in New York City. Died 1914.

Bicycle (bi'si-kl), a light-wheeled vehicle propelled by the rider, consisting of two wheels attached to a frame composed of tubing. Between these is arranged an axle, attached to the lower part of the frame, to which are affixed two pedals, one on either side; to this axle is attached a sprocket-wheel over which runs an endless chain connecting with a smaller sprocket on the rear wheel. A chainless bicycle has also been devised, bevel gears and rod, incased in a metal covering, taking the place of the chain and sprocket wheel. The frames are distinguished as 'diamond' and 'drop'; the former used by men, the latter by women cyclists. The rider sits upon a saddle attached to a seat-post affixed to a frame; he steers the machine by means of a handle-bar, which turns the front wheel in any direction required. The momentum of the vehicle, the action of the rider's body and the proper use of the handle or steering bar keeps it in an upright position. The bicycle attained extraordinary popularity during the latter decades of the nineteenth century, but has since been much less used. The original bicycle was made with a large wheel forward and a very small wheel in the rear, the pedals being attached directly to the axle of the large wheel and the seat to a rod above the large wheel which connected the small wheel to the handle bar. This has been replaced by the more satisfactory safety bicycle in which the wheels are of equal size. Motorcycles, moved by gasoline engines, have recently come into common use. See *Motorcycles*.

Bida (bē'dā), a town and administrative district in the British protectorate of Northern Nigeria, Africa.

Bidar (bē'dur), a town in the Nizam's dominions, India. Has manufactures of metal goods, to which it has given the name Biddery wave. Pop. 11,000.

Bidassoa (be-das-sō'a), a small river of Spain, forming for so much of its distance the boundary between France and Spain.

Biddeford (bid'e-ford), a city of York Co., Maine, on the Saco River, opposite to the city of Saco, with which it is connected by several bridges. The falls of the Saco, 42 feet high, here afford valuable water-power, used in large cotton and machinery factories, and saw mills. Pop. 17,079.

Bidder, GEORGE PARKER, English engineer, born 1806; died 1878. He was associated with Robert Stephenson in the construction of the London and Birmingham railway, later constructing railway systems at home and on the Continent; planned the Victoria Docks, invented the railroad swing-bridge, and was one of the founders of the first electric telegraph companies.

Biddle, CLEMENT, American military officer, born in Philadelphia, Pa., May 10, 1740; died there July 1, 1814. He was descended from a New Jersey Quaker family, and organized a Quaker company of volunteers for the revolutionary army, in 1775. He was one of the framers of the state constitution; fought at Trenton, Princeton, Brandywine, Germantown and Monmouth, and was at Valley Forge.

Biddle, JAMES, American naval officer, born in Philadelphia, Pa., Feb. 28, 1783. He was wrecked in the frigate *Philadelphia*, off Tripoli, in 1803, and held as a prisoner 19 months. As first lieutenant of the *Wasp* he led the boarders in the action with the *Frolic* Oct. 18, 1812. In command of the *Hornet* he captured the *Penguin*, March 23, 1813. He died Oct. 1, 1848.

Biddle, JOHN, founder of English Unitarianism, born in 1615; died in prison in 1662. He was educated at Oxford, and became master of the free school at Gloucester. He was repeatedly imprisoned for his anti-Trinitarian views. A general act of oblivion in 1652 insured him his liberty, when he immediately disseminated his opinions both by preaching and by the publication of his *Twofold Scripture Catechism*. He was again imprisoned and to save his life Cromwell banished him to St. Mary's Castle, Scilly, and assigned him a hundred crowns annually. Here he remained until liberated in 1658. He continued to preach till the death of Cromwell, and also after the Restoration, when he was committed to jail in 1662, and died a few months after.

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Biddle, NICHOLAS, naval officer, born at Philadelphia in 1750. He entered the British navy in 1770, served in the same ship with Nelson, and in 1776 returned to America and was one of the first naval officers in the patriot cause. As captain of the *Andrew Davis* he captured several prizes. In 1777 he took command of the frigate *Randolph*, and in an engagement in March, 1778, with the British frigate *Yarmouth*, the magazine of the *Randolph* exploded, Captain Biddle and nearly all his crew being killed.

Biddle, NICHOLAS, financier, nephew of the preceding, was born at Philadelphia in 1786; died in 1844. He edited for a time *The Portfolio*, a literary journal; in 1810 was elected to the Pennsylvania legislature; served in the State Senate 1814-17; and in 1819 was appointed a director of the United States Bank by President Monroe. In 1823 he became president of that institution, and by virtue of his financial measures supplied the country with a uniform currency. After the veto of the bank charter bill by President Jackson in 1832 and the closing of the Bank in 1836, a 'United States Bank' was chartered by the State of Pennsylvania and Mr. Biddle made its president. It was conducted in a way that led to its failure in 1841, a disaster for which President Biddle was severely blamed. He was also president of the board of trustees of the fund left by Stephen Girard for the establishment of a college for orphan boys.

Biddle University, a Presbyterian institution, located near Charlotte, N. C., for the education of negroes. It was founded in 1867.

Bideford (bi'de-ford), a munic. borough and seaport of England, County Devon. Its industries embrace coarse earthenware, ropes, sails, etc. Pop. 9074.

Bidens, a genus of herbaceous composite plants related to *Dahlia* and *Coreopsis*. Commonly known as beggar's-lice.

Bidery (bid'e-ri; from *Bidar*, a town in India.) A kind of East Indian ornamental metal-work, consisting of damascening silver on some metal ground blackened by certain chemicals. The alloy used as the basis of the damascene work is of bronze or brass, and is highly resistive of corrosion.

Bidpai (bid'pi), or *PILPAI* (pil'pi), the reputed author of a very ancient and popular collection of Eastern fables. The original source of these stories is the old Indian collection of fables called *Panchatantra*, which acquired its present form under Buddhist

influences not earlier than the second century B.C. It was afterwards spread over all India and handed down from age to age in various more or less different versions. An abridgment of this collection is known as the *Hitopadesa*. The *Panchatantra* was translated into Pehlevi in the sixth century of our era. This translation was itself the basis of a translation into Arabic made in the eighth century; and this latter translation is the medium by which these fables have been introduced into the languages of the West. The first English translation was published in 1570.

Biebrich (bē'brih), a town of Prussia, district Wiesbaden, on the right bank of the Rhine, with a fine castle, formerly the residence of the Dukes of Nassau. Pop. 20,137.

Biel (bēl). See *Bienne*.

Biela's Comet (bē'la), discovered by M. Biela (1782-1856), an Austrian officer, in 1826. Its periodic time was determined as 6 years 38 weeks. It returned in 1832, 1839, 1846, and 1852. On the latter two occasions it was in two parts, each having a distinct nucleus and tail. It has not since been seen as a comet; but in 1872, 1879, and 1885, when the earth passed through the comet's track, immense flights of meteors were seen, which have been connected with the broken-up and dispersed comet.

Bielef (by-ā'lef), a town in Russia, government of Tula, with manufactures of soap, leather, etc., and a considerable trade. Pop. 9567.

Bielefeld (bē'le-felt), a town of Prussia, in the province of Westphalia, 38 miles E. from Münster; one of the chief places in Germany for flax-spinning and linen manufacture. Pop. 71,797.

Bielgorod (byel'go-rod), a town, Russia, in the government of Kursk, 76 miles S. from the town of Kursk, on the Donetz. It is the seat of an archbishop's see, and has important fairs. Pop. 21,850.

Bielitz (bē'lits), a town of Austrian Silesia, 42 miles W. S. W. of Cracow, with manufactures of woollens and linens, dye-works and printfields. Pop. 16,885.

Biella (bē-el'la), a town of North Italy, province of Novara, 36 miles N. N. E. of Turin. Pop. 3454.

Bielo-Ozero (byā'lo-o-zā'ro; 'white lake,' from its white clay bottom), a Russian lake, government of Novgorod, 25 miles long by 20 broad. An old wooden town, Bielozersk, is on the S. shore of the lake. Pop. 4286.

Bielopol (byā'lo-pol), a Russian town, government of Khar-kov. Pop. 15,233.

Bielsk (byelsk), a town of Russia, gov. of Grodno. Pop. 10,000.

Bieltai (byel'tei), a town of Russia, prov. Bessarabia. Pop. 18,000.

Bienhoa (bi-en-hwü'), a town in Cochinchina, capital of a province of the same name, 20 miles N. of Saigon.

Biennial (bi-en'i-al), a plant that requires two seasons to come to maturity, bearing fruit and dying the second year.

Bienne (bi-an), or **BIEL** (bël), a town of Switzerland, canton of Bern, 16 miles N. W. of Bern, beautifully situated at the N. end of the lake of same name, and at the foot of the Jura. Watchmaking is an extensive industry. Pop. 22,016.—The LAKE is about 7½ miles long by 3 broad. It receives the waters of Lake Neuchâtel by the Thiel and discharges itself into the Aar.

Bienville (byan-vël), **JEAN BAPTISTE LE MOYNE**, Sieur de, American pioneer, born in Montreal, Canada, 1680; died in France 1768. In 1698 he founded a French settlement at Biloxi, near the mouth of the Mississippi River. He was governor of the colony of Louisiana 1701-13, 1718-26 and 1733 until about 1740. In 1718 he founded the city of New Orleans.

Bierce, **AMBROSE**, American author and journalist, born in Ohio, 1842. Served in the Civil War and was breveted major for distinguished services. Afterwards connected with the San Francisco Examiner. He has written a number of books, among them being *Fantastic Fables* and *The Shadow on the Dial*. He was killed in Mexico in 1914.

Bierstadt (bër'stat), **ALBERT**, painter, born at Solingen, Germany, in 1828; died in 1902. His parents emigrated to New England in his infancy. Studying landscape painting in Germany in 1853-1856, he returned to the United States in 1857 and in 1858 accompanied General Lander's expedition to the Rocky Mountains. This resulted in his admired *View of the Rocky Mountains—Lander's Peak*. Other productions are *Sunlight and Shadow*, *Storm on the Matterhorn*, etc.

Bies-Bosch (bës-bosk), a marshy sheet of water interspersed with islands, between the Dutch provinces of North Brabant and South Holland, formed by an inundation in 1421.

Bifröst (bif'rëst), in northern mythology the name of the bridge represented as stretching between heaven and earth (Asgard and Midgard); really the rainbow. It was used only by the gods and was guarded by Heimdal, the god of light.

Bigamy (big'a-mi), the act or state of having two (or more) wives or husbands at once, an offense against the laws of most states. By the law of England bigamy is a felony, punishable with penal servitude for any term exceeding seven years and not less than three years, or imprisonment, without hard labor, not exceeding seven years. If the party's wife or husband shall have been absent continuously for seven years and not known to be alive the penalty is not incurred. The statutory provisions in the United States against bigamy are in general similar to and copied from the English statute, excepting as to the punishment, which differs in many of the States.

Big Ben, a great bell, weighing 13 tons, in the Westminster clock tower, London.

Big Bethel, a village between York and James rivers, Virginia, the scene of one of the early engagements of the Civil war. Here on June 10, 1861, the Federals (2500) under General Pierce were defeated by the Confederates (1800) under General Magruder.

Big Black River, a tributary of the Porcupine River in Alaska, into which it flows after a course of over 200 miles.

Big Black River, a tributary of the Mississippi, rising in Webster Co., Miss., and flowing S. W. into the Mississippi 20 miles above Vicksburg. Length 260 miles.

Bigelow, (big'e-lo), **EDWARD FULLER**, American scientist and writer on Nature-subjects, born in Connecticut 1860. For three years he was the editor of *Popular Science*, and of *The Observer*, a nature-magazine, for eight years; since 1900 editor of *Nature and Science* department St. Nicholas Magazine. Author of *Bigelow's Descriptive Plant Analysis*, etc.

Bigelow, **ERASTUS BRIGHAM**, inventor, born at West Boylston, Massachusetts, in 1814; died in 1878. He invented machines for carpet and counterpane weaving, which were a great improvement in those previously in use.

Bigelow, **FRANK HAGAR**, American meteorologist, born at Concord, Mass., in 1851, professor of meteorology in the United States Weather Bureau 1891-1910; since 1910 professor of meteorology in the Meteorological Office of Buenos Ayres.

Bigelow, **JOHN**, well-known author and journalist, born in Ulster Co., New York, in 1817; was graduated at Union College in 1835. He was prison-inspector at Sing Sing 1845-48 and in 1850 became associated with Bryant as editor of the *New York Evening Post*.

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In 1861 he was appointed consul at Paris, in 1864 chargé-d'affaires, and in 1865 U. S. Minister. In 1875 was elected by the Democratic party Secretary of State for New York. His works include *Jamaica in 1850, or the Effects of Sixteen Years of Freedom on a Slave Colony; The United States in 1863* (in French), *Life of Benjamin Franklin*, and *The Useful Life*. Died in 1911.

Bigelow, POULTNEY, author and traveler, born at New York in 1855. After practising law in New York, he traveled widely as a newspaper correspondent and made canoe voyages up the principal rivers of Europe. His works include *The German Emperor and His Eastern Neighbors*, *Paddles and Politics down the Danube*, *White Man's Africa*, etc.

Bigelow, TIMOTHY, American soldier, born at Worcester, Mass., Aug. 12, 1739; died there March 31, 1790. On May 23, 1775, he led a company of minutemen to Cambridge; accompanied Arnold in his expedition to Quebec in 1775, where he was made a prisoner. As colonel he assisted in the capture of Burgoyne.

Biggleswade (big'gels-wād), a town in England, County Bedford, giving name to a parl. div. of the county; manufactures of straw-plait. Pop. 5375.

Big Horn, the *Ovis montana*, or wild sheep, of the Rocky Mountains, named from the size of its horns. The animal is stoutly built about 3½ ft. high at the shoulder. The big horns are gregarious, going in herds of twenty or thirty, frequenting the craggiest and most inaccessible rocks, and are wild and untamable. It is called also Rocky Mountain sheep.

Big Horn Mountains, a range in the N. portion of Wyoming, east of Big Horn River. It has summits 8000 to 12,000 feet high. In this region occurred the famous 'massacre of the Big Horn,' the slaughter by Indians in 1876 of General Custer's whole company of troops.

Bignonia (big-nō'ni-a), a genus of plants of many species, inhabitants of hot climates, nat. order *Bignoniaceæ*, usually climbing shrubs furnished with tendrils; flowers mostly in terminal or axillary panicles; corolla trumpet-shaped, hence the name of *trumpet-flower* commonly given to these plants. All the species are splendid plants when in blossom, and many of them are cultivated in gardens.

Big Rapids, a city, county seat of Mecosta Co., Michigan, 56 miles N. of Grand Rapids. There is good water-power, and there are extensive fur-

niture and other wood-working industries. Pop. (1910) 4519.

Big Sandy River is an affluent of the Ohio River, formed by the junction of two branches which rise in West Virginia. The west fork traverses part of Kentucky and the east fork forms part of the boundary between West Virginia and Kentucky.

Big Sioux River, a tributary of the Missouri River. It rises in N. E. South Dakota and flows S., forming in its lower course the boundary between South Dakota and Iowa. It enters the Missouri 2 miles above Sioux City, after a course of 300 miles.

Bihao (bē-hāc'), a town and fortress in Bosnia. Pop. (1910) 6200.

Bihari, ALEXANDER, a Hungarian painter, born 1856; died 1908. Among his paintings are *A Roumanian Funeral* and *Gipsies with the Broken Violin Before the Country Justice*, the latter owned by the Austrian emperor.

Bijanagur or BIJNAGUR (bē-j-n-a-gur'), a city of Hindustan, now in ruins, in the Madras presidency. Sacked by Mohammedans of the Deccan in 1565.

Bijapur. See *Bejaunoor*.

Bijawar, petty native state, Bundelkhand Agency, India; area 974 sq. miles. Diamonds and ironstone are found. Pop. 110,000.

Bijnaur. (bij-now'r'), a town of Hindustan, Northwestern Provinces. Pop. 17,583.

Bikanir (bik-a-nēr'), a native state of India. A region of sand dunes, but many sheep, horses and camels are bred, and its salt lakes yield a good revenue. Area, 23,311 sq. miles; pop. 584,627.—BIKANIR, the capital, manufactures blankets, sugar-candy, pottery, etc. Pop. including suburbs, 53,100.

Bikélas (bi-kā'lās), DIMITRIOS, a Greek poet, born at Hermupolis, on the island of Syra, in 1835; died at Athens 1908. He wrote *Lukis Laras*, a story of the Greek war of independence, and besides producing a collection of poems, translated a number of Shakespeare's plays into modern Greek.

Bilara, town, Rajputana, India, with a population of 11,000.

Bilaspur (bi-lās-pōr'), a district of the Central Provinces of India, generally hilly and traversed by the Mahanuddy. Area, 7602 sq. miles. Bilaspur is the principal town, situated on the Arpa. Pop. (1901) 18,937.

Bilbao (bil-bā'ō), a city in northern Spain, capital of the province of Biscay or Bilbao, on the navigable Nervion, 6 miles from the sea. It has a cathedral and several convents; possesses

large ship-yards and iron-foundries. It is one of the chief seaports of Spain and exports large quantities of iron-ore. Pop. 83,308.

Bilboes (bil'bōz), an apparatus for confining the feet of offenders, especially on board ships, consisting of a long bar of iron with shackles slid-



Bilboes, from the Tower of London.

ing on it and a lock at one end to keep them from getting off, offenders being thus 'put in irons.'

Bilderdijk (bil'dér-dik), WILLEM, an eminent Dutch poet, born 1756; died 1831. His contributions to the literature of his country were many and varied, including works on philology, history, and poetry, including translations from the Greek and Latin poets.

Bile (bil), a yellow bitter liquor, separated from the blood by the primary cells of the liver, and collected by the biliary ducts, which unite to form the hepatic duct, whence it passes into the duodenum, or by the cystic duct into the gall-bladder to be retained there till required for use. The most obvious use of the bile in the animal economy is to aid in the digestion of fatty substances and to convert the chyme into chyle. It appears also to aid in exciting the peristaltic action of the intestines. The natural color of the feces seems to be due to the presence of bile. The chemical composition varies with the animal which yields it, but every kind contains two essential constituents, the bile salts and the bile coloring matter. The bile salts are a glycocholate and a taurocholate of soda; the bile-pigments are bilirubin and biliverdin. Mucin is another constituent, giving to the bile its viscid quality. The other organic substances include fats and soaps, and cholesterin, which is a crystallizable substance usually the chief constituent of gall-stones.

Bilge (bilj), the breadth of a ship's bottom, or that part of her floor which approaches to a horizontal direction, on which she would rest if aground.—*Bilge-water*, water which enters a ship and lies upon her bilge or bottom; when not drawn off it becomes dirty and offensive.—*Bilge ways*, planks of timber placed under a vessel's bilge on the building-slip to support her while launching.

Bilgram, a town in the United Provinces, British India, with remains of an ancient fort and temples of Srinagar, built by Sri Ram. Pop. 11,000.

Bilharzia, a genus of trematodes, containing a parasite that is

injurious to man. This organism was discovered in 1852 by Bilharz, hence the name, though it was later named *Schistosoma hematobium*. Its presence, in the mucous membrane of the urinary tract, gives rise to the condition known as *hematuria*, a malady characterized by hematuria, inflammation, etc. It is found in Africa.

Biliary Calculus, a concretion which forms in the gall-bladder or bile-ducts; gall-stone. It is generally composed of a peculiar crystalline fatty matter which has been called *cholesterin*, also bile-salts and calcium salts.

Bilin (be-lén'), a town of Bohemia, 40 miles N. W. Prague, prettily situated in the vale of Billa, and celebrated for its mineral waters, which are drunk on the spot and largely exported. Pop. 7800.—Also the name of a river in British India, 280 miles long.

Bilirán (bê-lê-rân'), an island of the Philippines, off the north coast of Leyte and belonging to Leyte Province. Its surface is generally mountainous, with Mabin its highest peak, 443 ft. The area of the island is 190 sq. miles. Pop. 19,147.

Biliton. See *Billiton*.

Bill, a cutting instrument hook-shaped towards the point, or with a concave cutting edge; used by plumbers, basket-makers, gardeners, etc., made in various forms and fitted with a handle. Such instruments, when used by gardeners for pruning hedges, trees, etc., are called *hedge-bills* or *bill-hooks*. Also an ancient military weapon, consisting of a broad, hook-shaped blade, having a short pike at the back and another at the summit, attached to a long handle, used by the English infantry especially in defending themselves against cavalry down to the fifteenth century, and by civic guards or watchmen down to the end of the seventeenth.

Old English Bill, time of Elizabeth.

Bill, a written or printed paper containing a statement of any particulars. In common use a tradesman's account, or a printed proclamation or advertisement, is thus called a bill. In legislation a bill is a draft of a proposed statute submitted to a legislative assembly for approval, but not yet enacted or passed and made law. When the bill has passed and received the necessary assent it becomes an act.

Bill of Attainder and of *Pains and Penalties* are forms of procedure in the



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sorted to in times of political agitation to
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individual. The person attainted lost all
civil rights, he could have no heir, nor
could he succeed to any ancestor, his
estate falling to the crown. These bills
were promoted by the crown, or the dom-
inant party in Parliament, when any
individual obnoxious to it could not
readily be reached by the ordinary forms
of procedure. Parliament being the high-
est court of the kingdom could dispense
with the ordinary laws of evidence, and
even, if actuated by passion or servilely
devoted to the authorities, condemn the
accused in the most arbitrary manner.
They were very common under the
Tudors, and as late as 1820 the trial of
Queen Caroline took place under a bill of
pains and penalties. Bills of attainder
are prohibited by the constitution of the
United States.

Bill of Costs is an account rendered by
an attorney or solicitor of his charges and
disbursements in an action or in the con-
duct of his client's business.

Bill of Entry, a written account of
goods entered at the custom-house.

Bill of Exchange (including promissory
notes and inland bills or acceptances).
A bill of exchange is defined as an order
in writing addressed by one person to
another, signed by the person giving it,
requiring the person to whom it is ad-
dressed to pay on demand or at a fixed
or determinable future time a certain sum
of money to or to the order of a specified
person or to bearer. Bills of exchange
are divided into foreign and inland bills,
but in mercantile usage the term bill of
exchange is seldom applied to other than
foreign bills. An inland bill of exchange,
generally called a bill of acceptance, has
more in common with a promissory note
than with a foreign bill of exchange. We
give the common forms of the three docu-
ments.

(1) Promissory Note.

\$110.00.

Philadelphia, January 2, 1912.

Three months after date I promise to pay
to the order of W. S. [or 'to W. S. or his order']
the sum of One Hundred and Ten Dollars, for
value received.

(Signed) J. D.

(2) Inland Bill of Acceptance.

\$11.00.

Philadelphia, January 2, 1912.

Three months after date pay to our order
[or 'to the order of W. S.'] the sum of One Hun-
dred and Ten Dollars, for value received.

(Signed) F. G. & Co.

To Messrs. A. B. & Co., New York.

This form is accepted by writing across the
body of the bill:—

'Accepted,
A. B. & Co.'

(3) Foreign Bill of Exchange.

\$110.00.

Lima, January 2, 1912.

At sixty days' sight of this first of exchange
(second and third of same tenor and date unpaid),
pay to the order of W. S. the sum of One Hun-
dred and Ten Dollars, value as advised [or 'which
charge to our account,' or 'to account of—' as
advised.']

(Signed) F. & Co.

To F. B. & Co., Liverpool.

(Second and third drawn in same form as the
first, one only of the set being negotiable. In
stead of three copies being used, which is called
drawing a bill in parts, one only may be drawn,
the form then used being 'this sola of ex-
change.')

The acceptor of this bill writes across it the
date on which it is presented, together with his
signature, thus:—

'Accepted Feb. 3, 1912.
F. B. & Co.'

There is usually a current rate of dis-
count for first-class bills, which is deter-
mined in Great Britain by the rates of
the Bank of England. When a bill
reached the date of payment, and was not
duly paid, it used to be *noted* or *protested*,
but this is now only done with foreign
bills. *Protesting* is a legal form, in
which the payee is declared responsible
for all consequences of the non-payment
of the bill. *Noting* is a temporary form,
used as a preliminary to protesting. It
consists in a record by a notary-public
of the presentation of the bill and of the
refusal of the payee to honor it. Unless
a bill is noted for non-payment on the
due date, the endorsers are freed from
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ance, varying in different countries, called
days of grace, has to be taken into ac-
count. In Great Britain three days of
grace are allowed on all bills indiscrimi-
nately, except bills drawn on demand. A
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merely to raise money on, and not given,
like a genuine bill of exchange, in pay-
ment of a debt, is called an *accommoda-
tion bill*. Different States in America
have different laws respecting days of
grace, and some have abolished days of
grace. The same is the case in some
European countries; in others the grace
varies from three to thirty days.

Bill of Health, a certificate or instru-
ment signed by consuls or other proper
authorities, delivered to the masters of
ships at the time of their clearing out
from all ports or places suspected of be-

ing particularly subject to infectious disorders, certifying the state of health at the time that such ships sailed.

Bill of Indictment, a written accusation submitted to a grand-jury. If the grand-jury think that the accusation is supported by probable evidence, they return it to the proper officer of the court endorsed with the words 'a true bill,' and thereupon the prisoner is said to stand indicted of the crime and bound to make answer to it. If the grand-jury do not think the accusation supported by probable evidence, they return it with the words 'no bill,' whereupon the prisoner may claim his discharge.

Bill of Lading, a memorandum of goods shipped on board of the vessel, signed by the master of the vessel, who acknowledges the receipt of the goods and promises to deliver them in good condition at the place directed, dangers of the sea excepted. Bills of lading can be transferred by endorsement; the endorsement transfers all rights and liabilities under the bill of lading of the original holder or consignee.

Bill of Sale, a formal instrument for the conveyance or transfer of personal chattels, as household furniture, stock in a shop, shares of a ship. It is often given to a creditor in security for money borrowed, or obligation otherwise incurred, empowering the receiver to sell the goods if the money is not repaid with interest at the appointed time or the obligation not otherwise discharged; in this case commonly called, in the United States, a chattel mortgage.

Billaud-Varenne (bi-yô-vâ-ren), JACQUES NICOLAS, a noted French revolutionist, was born at Rochelle in 1750; died in Haiti in 1819; he bore a principal part in the murders and massacres which followed the destruction of the Bastille; voted immediate death to Louis XVI; and eventually assisted in bringing about the fall of Robespierre. In 1795, on a reaction having taken place against the ultra party, he was arrested and banished to Cayenne.

Bill Broker, a financial agent or money-dealer, who discounts or negotiates bills of exchange, promissory-notes, etc.

Bill-chamber, a department of the Court of Session in Scotland, in which one of the judges officiates at all times during session and vacation. All proceedings for summary remedies, or for protection against impending proceedings, commence in the bill-chamber, such as interdicts. The process of sequestration or bankruptcy also issues from this department.

Bil'leting, a mode of feeding and lodging soldiers when they are not in camp or barracks by quartering them on the inhabitants of a town. The necessity for billeting occurs chiefly during movements of the troops or when any accidental occasion arises for quartering soldiers in the town which has sufficient barrack accommodation.

Billet-molding, an ornament common in Norman architecture, consisting of an imitation of a billet, or round pieces of wood, placed in a hollow molding with an interval between each two usually equal to their own length.

Bill-fish, the gar-pike or long-nose gar (*Lepidosteus osseus*), a fish common in the lakes and rivers of the United States; but the name is also given to other fishes.

Bill-hook. See *Bill* (cutting instrument).

Billiards (bil'yérds), a well-known game, probably (like its name) of French origin, played with ivory balls on a flat table. Various modes of play, constituting many distinct games, are adopted, according to the tastes of the players, some being more in favor in one country, some in another. The standard American table is of oblong shape, by 10 feet, though more commonly the size is 4½ by 9 feet. In England the table is 6 by 12 and has six holes at the corners and sides called pockets. In the French table, the kind now commonly used in America, there are no pockets. Each player is provided with a cue to strike the balls. The cue is a wooden rod from 4 or 5 to 6 or 8 feet long, rounded in form, and tapering gradually from 1½ inches in diameter at the butt to ¾ inch or less at the point, which is tipped with leather and rubbed with chalk to make the stroke smooth. In the three-ball game two players engage. Each has a white ball, and a red ball is common to the two. This was called *caram bole* in French and became *cannon* in England, and *carom* in the United States. When the game has commenced the player is at liberty to strike at either his opponent's ball or the red, and continues to play as long as he succeeds in scoring. The whole of an uninterrupted run of play is called a *break*. In the four-ball game it is much easier to make points, the larger number of balls offering more opportunities for successful caroms. There are many rules connected with the game which must be omitted here. By "nursing" the balls, keeping them together near the cushions, extraordinary runs have been made by billiard experts. Scores of 500 and more

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Billings

points are on rec.d. After the ordinary game the most favorite varieties are *pyramids* and *pool*. These are played on pocket tables. The former is so called from the position in which the balls are placed at the beginning of the game. It is played with fifteen balls; and the object of the players is to try who will pocket, or 'pot,' the greatest number of balls. This corresponds largely to the American form of pool. Pool is also a game of 'potting,' but is played somewhat differently. It is a favorite game with those who play for stakes, and may be considered an English variant of billiards. It embraces an indefinite number of players, each of whom is provided with a ball of a different color from any of the others. They play in succession, and each tries to pot his opponent's ball. If he succeeds with one he goes on to the next; if he fails another player takes his turn, playing first on the ball of the last player. There are thus two points which a pool-player has to aim at: to pot as many balls as possible, and to keep his ball in a safe position relatively to that of the following player, as the player whose ball is potted has to pay the prescribed penalty.

Billings (bil'ings), a city, county seat of Yellowstone Co., Montana, on the Yellowstone River. Farming and stock raising are the chief industries. Pop. 13,500.

Bilings, JOHN SHAW, noted American surgeon and writer on medicine and hygiene, born 1839; died 1913. He served during the Civil war, and was promoted to rank of lieutenant-colonel for distinguished conduct.

Billings, JOSH, pseudonym of Henry Wheeler Shaw, the American humorist (*q. v.*).

Billings, WILLIAM, American musical composer, born in Boston, Mass., 1748. He was a tanner by trade, educated himself to be a teacher and is said to be the first American composer. He revolutionized American church music by his works, which include *The New England Psalm-Singer* (1770), *The Singing Master's Assistant* (1778). He also wrote a number of patriotic pieces during the Revolution, which enjoyed great favor among the troops. Died 1800.

Billingsgate (bil'ing-z-gat), the principal fish-market of London, on the left bank of the Thames, a little below London Bridge. From the character, real or supposed, of the Billingsgate fish-dealers, the term *Billingsgate* is applied generally to coarse and violent language.

Billington (bil'ing-tun), ELIZABETH, English singer, born about 1768 in London, died in Italy in

1818. Bianchi composed the opera of *Ines de Castro* expressly for her performance at Naples. She retired from the stage in 1811.

Billiton, or BLITOENG (blä-tong'), a Dutch East Indian island between Banca and the s. w. of Borneo, of an irregular subquadrangular form, area 1773 sq. miles. It exports sago, cocoanuts, pepper, tortoise-shell, trepang, edible bird's-nests, etc. Its tin deposits are of much importance. It was ceded to the British in 1812 by the Sultan of Palembang, but in 1824 it was given up to the Dutch. Pop. about 42,000.

Billroth (bil'röt), ALBERT CHRISTIAN THEODOR, a noted Austrian surgeon, of Swedish origin, was born at Bergen in 1829. He filled the chair of surgery at Zürich from 1860 to 1867 and in the latter year accepted the professorship of surgery at Vienna, where the remainder of his professional life was spent. As an author his principal work was *Allgemeine Chirurgische Pathologie und Therapie* (1863). He died in 1894.

Bilney, THOMAS, an English martyr, born probably about 1495; burnt at the stake in London, August 19, 1531. While to the last in all essential points he remained an orthodox Roman Catholic, he fell under the displeasure of Wolsey, and was convicted of heresy. He was given an opportunity to recant, which he did, but later, overcome by remorse for his apostasy, he resumed his preaching, now in the open fields. He was again tried, degraded from his orders, and handed over to the civil authorities for execution.

Biloxi (be-lox'i), a city of Mississippi, on the Gulf of Mexico, with shipyards, canneries, and a large trade. Was settled by French in 1699 and was first capital of Louisiana Territory. Pop. 7988.

Biloxi, a small Indian tribe inhabiting Louisiana, thought to belong to the Choctaws, but proved to belong to the Sioux.

Bilston (bil'stun), a town of England, in Staffordshire, forming part of the parliamentary borough of Wolverhampton; it has extensive manufactures of hardware. Pop. (1911) 25,681.

Bimetallism (bi-met'al-izm), that system of coinage which recognizes coins of two metals (silver and gold) as legal tender to any amount; or in other words, the concurrent use of coins of two metals as a circulating medium, the ratio of value between the two being arbitrarily fixed by law. It is contended by advocates of the system that by fixing a legal ratio between the value of gold and silver, and using both as

Bimetallism

legal tender, fluctuations in the value of the metals are avoided, while the prices of commodities are rendered steadier. The system of bimetallism has been set aside in most commercial countries in favor of a single gold standard. The United States has been one of the latest countries to adopt this. After the election of 1900 bimetallism passed from view, and the silver issue was withdrawn from the Democratic platform in 1904.

Bimlipatam (bim-li-pā-tām'), a seaport of India, Madras Presidency, with a brisk trade. Pop. 10,212.

Binalonan, a town in Luzon, Philippine Islands, in Pangasinan province. Pop. 10,295.

Binan (bē-nyān'), a town of the province of La Laguna, Luzon, Philippine Islands, in a rice and timber producing country. Pop. 9563.

Binary (bi'nā-ri), twofold; double.—*Binary compound*, in chemistry, a compound of two elements, or of an element and a compound performing the function of an element, or of two compounds performing the function of elements, according to the laws of combination.—*Binary theory of salts*, the theory which regarded all salts as being made up of two oxides, an acid oxide and a basic oxide; thus sodium carbonate as made up of soda (Na_2O) and carbon dioxide (CO_2).—*Binary star*, a double star whose members revolve round a common center of gravity.

Binche (bānsh), a town of Belgium prov. Hainaut, with manufactures of lace, pottery, etc. Pop. 12,500.

Bindrabund. See *Brindaban*.

Bindweed, the common name for plants of the genus *Convolvulus*, especially of *C. arvensis*, and also of plants of the allied genus *Calyptegia*, especially *C. soldanella* and *C. sepium*. The black bryony is called *black bindweed*; smilax is called *rough bindweed*. *Solanum dulcamara* (the bittersweet) is the *blue bindweed* of Ben Jonson.

Bingen, a town of Germany, in Hesse-Darmstadt, on the left bank of the Rhine, in a district producing excellent wines. The Mäuseturm or Mouse-tower in the middle of the river is the scene of the well-known legend of Bishop Ilatto. Pop. (1905) 9950.

Bingham (bing'am), JOHN A., lawyer and legislator, born in Pennsylvania in 1815; died in 1900. Admitted to the bar in 1840, elected to Congress in 1854, and re-elected for several terms, serving 16 years. He was distinguished as a debater. In 1868 he, with Thaddeus Stevens, were made a committee to im-

peach Andrew Johnson, President of the United States, and was chairman of the managers who conducted the impeachment trial.

Bingham, JOSEPH, an English writer, born in 1668; died in 1722. He distinguished himself as a student at Oxford, and devoted his attention particularly to ecclesiastical antiquities. He was compelled to leave the university for alleged heterodoxy, but was presented the living of Headbournworthy, near Winchester, and afterwards to that of Havant, near Portsmouth. His great work, *Origines Ecclesiasticae*, or *Antiquities of the Christian Church*, in 10 vols., was published 1708-1722.

Binghamton (bing'am-ton), a city and county seat of Broome county, N. Y., at the junction of the Chenango and Susquehanna rivers, 215 miles N. W. of New York city. It is the seat of several collegiate institutions, of the State Hospital for the Insane, and homes for orphan children. There is also a state armory. It has an extensive trade, and many important manufactures, cigar-making being a leading industry. It receives its name from William Bingham, once the owner of its site. He was a member of the Continental Congress, 1783-88 and of the United States Senate, 1795-1801. Binghamton lies in a butter and cheese-making district. Pop. 48,443.

Bingley, a market town, W. Riding of Yorkshire, 15 miles N. W. of Leeds, with considerable manufactures of worsted, cotton, paper, and iron. Pop. 18,759.

Binmaley, a Philippine town in the province of Pangasinan, Luzon, on the delta of the river Agno. It is the northern terminus of the Manila and Dagupan railway. Fisheries, pottery, salt manufacture, roofing made of Nipa leaves, and nipa wine are its industries. Pop. 16,439.

Binnacle (bin'a-kl), a case or box on the deck of a vessel near the steering apparatus, containing the compass and lights by which it can be read at night.

Binney, HORACE, born in Philadelphia in 1780; died in 1875; was a prominent lawyer, for many years leader of the Pennsylvania bar. He was a member of Congress from 1833 to 1835.

Binney, THOMAS, a popular independent preacher, theologian, and controversialist, born at Newcastle-on-Tyne 1798; died 1874; a voluminous writer.

Binocular (bi-nok'ū-lar), a field-glass or opera-glass, or a microscope suited for viewing objects with both eyes at once.

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Binomial (bi-nō'mi-al), in algebra, a quantity consisting of two terms or members, connected by the sign + or -. The *binomial theorem*, is the celebrated theorem given by Sir Isaac Newton for raising a binomial to any power, or for extracting any root of it by an approximating infinite series.

Bintang, an island of the Dutch East Indies, at the s. extremity of the Malay Peninsula; area 450 sq. miles; yields catechu and pepper. Pop. 18,000.

Binturong (bin'tur-ong; *Arctotis binturong*), a carnivorous animal of the civet family, with a prehensile tail, a native of India and the Eastern Archipelago.

Binue (bin'ū-e). See *Benue*.

Bio-Bio (bē'o-bē'o), the largest Chilean river, rises in the Andes, flows in a N. W. direction for about 225 miles, and falls into the Pacific at the city of Concepción. It gives name to a province of the country, with nearly 100,000 inhabitants; area 5246 sq. miles.

Biogenesis (bi-o-jen'e-sis), the history of life development generally; specifically, that department of biological science which speculates on the mode by which new species have been introduced; properly restricted to that view which holds that living organisms can spring only from living parents.

Biography (bi-og'ra-fi), that department of literature which treats of the individual lives of men or women; and also, a prose narrative detailing the history and unfolding the character of an individual written by another. When written by the individual whose history is told it is called an *autobiography*. This species of writing is as old as literature itself. In the first century after Christ Plutarch wrote his *Parallel Lives*; Cornelius Nepos, the *Lives of Military Commanders*; and Suetonius, the *Lives of the Twelve Caesars*. Modern biographical literature may be said to date from the seventeenth century, with Izaak Walton, since which time individual biographies have multiplied enormously. Dictionaries of biography have proved extremely useful, Bayle's *Dictionnaire Historique et Critique*, 1696, being perhaps the first of this class. During the nineteenth century were published the *Biographie Universelle*, 85 vols., 1811-62; *Nouvelle Biographie Générale*, 46 vols., 1852-66; Chalmers's *General Biographical Dictionary*, 32 vols., 1812-17; Lippincott's *Biographical Dictionary*; Leslie Stephen's *Dictionary of National Biography* completed in 63 volumes, the first of which

appeared in January, 1885; and Appleton's *Cyclopædia of American Biography*, (1888), with many other less voluminous examples.

Biology (bi-ol'o-jī), a comprehensive term for those departments of science that treat of living beings, including under this head both animals and plants. It therefore comprehends both botany and zoology in all their branches and details.

Bion (blon), an ancient Greek pastoral poet born in Smyrna, or in its neighborhood; flourished about 100 B.C. He wrote bucolic and erotic poems, fragments of which are extant. He is supposed to have spent the last years of his life in Sicily, where he was poisoned.

Bion, Greek philosopher, flourished in the first half of the 3d century. He taught philosophy at Rhodes, and died at Chalcis. He was a popular writer and appealed to the sympathies of the lower classes. Specimens of his apothegms may be found in Diogenes Laertius.

Biot (bē-ō), JEAN BAPTISTE, a French mathematician and physicist, born at Paris in 1774; died there in 1862. He became professor of physics in the Collège de France in 1800, in 1803 member of the Academy of Sciences. He is especially celebrated as the discoverer of the circular polarization of light. Besides numerous memoirs contributed to the Academy and to scientific journals, he wrote *Essai de Géométrie Analytique*; *Traité de Physique Experimentale et Mathématique*; and *Traité Élémentaire de Physique Expérimentale* as well as works on the astronomy of the ancient Egyptians, Indians, and Chinese.—His son, EDOUARD CONSTANT, was an eminent Chinese scholar.

Biplane (bi'plān), a flying machine composed of two gliding planes connected by upright stays, the operator and machinery being on the lower plane. See *Aeroplane*.

Bipont (OF BIPONTINE) EDITIONS, famous editions of the classic authors, printed at Zweibrücken (Fr. *Deux Ponts*, L. *Bipontium*), in the Rhenish Palatinate. The collection forms 50 vols., begun in 1779. It was finished at Strasburg.

Biquadratic (bi-quad-rat'ik) EQUATION, in algebra, an equation raised to the fourth power or where the unknown quantity of one of the terms has four dimensions. An equation of this kind when complete is of the form $x^4 + Ax^3 + Bx^2 + Cx + D = 0$, where A, B, C, and D denote any known quantities whatever.

Bir, or BIREH-JIK, a town of Asiatic Turkey, 62 miles N. E. Aleppo, on

the Euphrates, at the point where the great caravan route from Syria to Bagdad crosses the river. Pop. est. over 10,000.

Birbhum, or **BEERBHOOM** (bēr'b'höm), a district of British India, in the Bardwān division of Bengal; area, 1756 sq. miles. Chief manufactures, silk and lacquered wares. Pop. 902,280.

Birch (*Betula*), a genus of trees, order *Betulaceæ*, which comprises only the birches and alders, which inhabit Europe, Northern Asia, and North America. The common birch is indigenous throughout the north, and on high situations in the south of Europe. It is extremely hardy, and no other species of trees approach so near to the north pole. It is the only tree found in Greenland. The white, gray or poplar birch, *B. alba*, is the principal European species. The wood of this tree, which is light in color and firm and tough in texture, is used for chairs, tables, bedsteads, and the woodwork of furniture generally, also for fish-casks and hoops, and for smoking hams and herrings, as well as for many small articles. In Russia the oil extracted from it is used in the preparation of Russian leather, to which it imparts its well-known scent. The sap, from the amount of sugar it contains, affords a kind of agreeable wine, which is produced by the tree being tapped in the warm weather of spring, when the sap runs most copiously. Dried, ground and mixed with meal, birch bark is used in Norway for feeding swine; and in times of scarcity it has served for bread. The North American species are several and all of value. The canoe or paper-birch, *B. papyrifera*, is a large tree with tough, durable bark, largely used by the Indians in the manufacture of canoes and lodges. The yellow birch, *B. lutea*, so named from its beautiful bark of golden yellow color, grows to a large size and is much valued, its wood being heavy, strong and hard. The black, sweet, cherry- or mahogany-birch, *B. lenta*, has a spicy, aromatic bark, yielding a volatile oil identical with oil of wintergreen, and its heavy, dark-colored wood is largely used in cabinet work. Other species are the red or river-birch, *B. nigra*, of the Southern States, and *B. occidentales*, found in the Rocky Mountains and farther west. Several shrubby species are distributed through alpine and arctic regions, as the alpine birch, *B. nana*, the low or dwarf birch, *B. pumila*, and the scrub birch, *B. glandulosa*.—**BIRCH BEER** is an artificial non-fermented sweet liquid of a wine-red color, flavored with birch.

Birch, **SAMUEL**, orientalist, born in London in 1813; died in 1885.

He entered the British Museum as a tant keeper of antiquities in 1836, and ultimately became keeper of the Egyptian and Assyrian antiquities. He was especially famed for his capacity and skill in Egyptology, and was associated with Baron Bunsen in his work on Egypt, contributing the philological portions relating to hieroglyphics. His principal works besides numerous contributions to transactions of learned societies, to cyclopædias, etc., include *Gallery of Hieroglyphics*, 1842; *Introduction to the Study of Hieroglyphics*, 1857; *Egypt from Earliest Times*, 1875, and others.

Birch, **THOMAS**, an industrious historian, rian and biographer, born in London in 1705; killed by a fall from a horse in 1766. He took orders in the church in 1730, and obtained in 1734 living in Essex. In 1734 he engaged others in writing the *General History and Critical Dictionary*, founded on the plan of Bayle, and completed, in ten vols. in 1741. He subsequently obtained various preferments in the church.

Birch, **THOMAS**, American painter, born in London, England, in 1783; died at Philadelphia, Pa., 1851. He confined himself to portrait painting until 1807, when he took up marine painting, achieving a high reputation in that branch. Several of his works represent naval battles of the war of 1812, notably the engagement between the ship *United States* and the *Macedonian*, and that between the *Constitution* and the *Guerrière*. Many of these are in the Harrison collection at Philadelphia.

Birch-Pfeiffer (birk-pfi'fr), **LOTTIE**, a German dramatist and actress, born in Stuttgart in 1800; died at Berlin in 1872. She married Dr. Birch of Copenhagen in 1825, and obtained great success as a performer and author. She was for several years manager of the Zürich theater and latterly of the Hoftheater in Berlin. She wrote several novels and about seventy plays.—Her daughter, **WILHELMINE VON HILLERN** (born 1836) is known as a writer of novels.

Bird, **EDWARD**, an English painter, born at Wolverhampton in 1772; died at Bristol in 1819. He became an academician in 1815. He excelled in historical and genre subjects. Among his chief pictures are the *Death of Eli*, and *Field Chevy Chase, After the Battle*.

Bird, **ROBERT MONTGOMERY**, author, born at New Castle, Delaware, in 1803; died in 1854. He became a doctor in Philadelphia, wrote for Edwin Forrest the tragedy *The Gladiator*; also *Calaveras*, published *Calaveras*, a romance in Mexico and other novels, and in 1847

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came joint editor and publisher of the *North American and United States Gazette*.—His son FREDERICK M. BIRD, born 1838; died 1908, became professor of psychology in Lehigh University in 1881, and edited *Lippincott's Magazine* 1893-99.

Bird-bolt, a short, thick, blunt arrow for shooting at birds from a crossbow.

Birdcall, an instrument for imitating the cry of birds in order to attract them so that they may be caught.

Bird-catching Spider, a name applied to gigantic spiders of the genera *Mygale* and *Epeira*, more especially to the *Mygale avicularia*, a native of Surinam and elsewhere which preys upon insects and small birds which it hunts for and pounces on. It is about two inches long, very hairy, and almost black; its feet when spread out occupy a surface of nearly a foot in diameter.

Bird-cherry, a species of cherry (*Prunus padus*), a very ornamental tree in shrubberies from its purple bark, its bunches of white flowers, and its berries, which are successively green, red, and black. Its fruit is nauseous to the taste, but is greedily eaten by birds. The wood is much used for cabinet-work. It is common in the native woods of Sweden and Scotland.

Bird-lime, a viscous substance used for entangling birds so as to make them easily caught, twigs being for this purpose smeared with it at places where birds resort. It is often prepared from holly-bark, being extracted by boiling.

Bird of Paradise, the name for members of a family of birds (*Paradisæidæ*) of splendid plumage, allied to the crows, inhabiting New Guinea and the adjacent islands. Among the most striking of these birds are the great bird of paradise, *Paradisæa apoda*, the one most often found in collection; the king paradise bird, *Cincinurus regius*, a highly ornamented species; the rifleman or rifle-bird, *Ptiloris paradisæa*; the magnificent bird of paradise, *Diphyllodes magnifica*, characterized by an erectile ruff; the superb bird of paradise, *Lophorina atra*, a rare species. The feathers of the *P. major* and *P. minor* are these chiefly worn in plumes. These splendid ornaments are confined to the male bird.

Birds. See *Ornithology*.

Bird-seed, seed for feeding cage-birds, especially the seed of *Phalaris canariensis*, or canary-grass.

Bird's-eye, a name of germander speedwell (*Veronica chamaedrys*). Also a species of primrose, *Primula farinosa*.

Bird's-eye Limestone, a division of the Lower Silurian rocks of North America, apparently equivalent to the Llandeilo Beds, so called from the dark circular markings which stud many portions of its mass, which have been referred to the remains of brachiopods.

Bird's-eye Maple, curled maple, the sugar-maple when full of little knotty spots somewhat resembling birds' eyes, much used in cabinet-work.

Bird's-eye View, the representation of any scene as it would appear if seen from a considerable elevation right above.

Bird's-foot, a common name for several plants, especially papilionaceous plants of the genus *Ornithopus*, their legumes being articulated, cylindrical, and bent in like a claw.

Bird's-foot Trefoil, the popular name of *Lotus corniculatus*, and one or two other creeping leguminous plants common in Britain. The ordinary bird's-foot trefoil is a common British plant, and is found in most parts of Europe as well as in Asia, North Africa and Australia, and is a useful pasture-plant.

Bird's-nest, a name popularly given to several plants, as *Neottia nidus-avis*, a British orchid found in beech woods; so called from the mass of interlaced fibers which form its roots. *Monotropa hypopitys*, a parasitic ericaceous plant growing on the roots of trees in fir woods, the leafless stalks of which resemble a nest of sticks; and *Asplenium nidus*, from the manner in which the fronds grow, leaving a nest-like hollow in the center.

Birds'-nests, EDIBLE, the nests of the salangane (*Collocalia fuciphaga*) and other species of swifts (or swiftlets) found in the Indian seas. They are particularly abundant in the larger islands of the Eastern Archipelago. The nest has the shape of a common swallow's nest, is found in caves, particularly on the seashore, and has the appearance of fibrous, imperfectly concocted isinglass. When procured before the eggs are laid the nests are of a waxy whiteness and are then esteemed most valuable; when the bird has laid her eggs they are of second quality; when the young are fledged and flown the old nest is destroyed by the nest gatherers, to promote the construction of new nests. They appear to be composed of a mucilaginous substance

are then esteemed most valuable; when the bird has laid her eggs they are of second quality; when the young are fledged and down, of third quality. They appear to be composed of a mucilaginous substance secreted by special glands, and not, as was formerly thought, made from a glutinous marine fucus or sea-weed. The Chinese consider the nests as a great stimulant and tonic, and it is said that about 8½ millions of them are annually imported into Canton.

Birds of Passage, birds which migrate with the season from a colder to a warmer, or from a warmer to a colder climate, divided into *summer birds of passage* and *winter birds of passage*. Such birds always breed in the country to which they resort in summer, i. e., in the colder of their homes. Among European summer birds of passage are the cuckoo, swallow, etc. In America the robin is a familiar example. See *Migration of Animals*.

Birds of Prey, the Accipiters or Raptores, including vultures, eagles, hawks or falcons, buzzards, and owls.

Bird-Spider. See *Bird-catching Spider*.

Bireme (bi'rēm), an ancient vessel with two banks or tiers of oars; *trireme*, one with three tiers; *quadrireme*, one with four; *quinquereme*, one with five.

Biren (bē'ren), or **BI'RON**, ERNEST JOHN VON, Duke of Courland, born in 1687; died 1772; was the son of a landed proprietor. He gained the favor of Anna, Duchess of Courland and niece of Peter the Great of Russia, and when she ascended the Russian throne (1730) Biren was loaded by her with honors, and introduced at the Russian court. He was made Duke of Courland in 1737, and continued a powerful favorite during her reign, freely indulging his hatred against the rivals of his ambition. He caused 11,000 persons to be put to death, and double that number to be exiled. On the death of Anna he became regent, but he was exiled to Siberia in 1741. On the accession of Elizabeth to the throne she permitted his return to Russia, and in 1763 the duchy of Courland was restored to him.

Biretta, BIRETTA, BERET'TA (bi-ret'a), an ecclesiastical cap of a square shape with stiff sides and a tassel at top, usually black for priests, violet for bishops, and scarlet for cardinals.

Birkbeck (bir'bek), GEORGE, the founder of mechanics' institutes, born at Settle, Yorkshire, in 1776;

died at London in 1841. He studied medicine at Edinburgh; was appointed to a chair of natural and experimental philosophy in the Andersonian Institute, Glasgow in 1799, where he successfully established a class for mechanics. In 1808 he settled as a physician in London and in 1822 founded the London Mechanics' Institute, now known as Birkbeck Literary and Scientific Institution.

Birkenfeld (bir'ken-felt), an old mining principality belonging to Oldenburg, surrounded by Rhenish districts of Coblenz and Treves, area 312 sq. m.; pop. 43,400. It has a market town of the same name.

Birkenhead (bir'ken-hed), a borough of England, in Cheshire, on the estuary of the Mersey, opposite Liverpool. It has commodious docks and a lineal quay space of over 9 miles, a complete system of railway communication for the shipment of goods and discharging of steamers. The principal industries are shipbuilding and engineering. Its commerce is in all respects a branch of that of Liverpool. The communication with Liverpool is by large steamboats and by a railway tunnel under the bed of Mersey 4½ miles long including approaches, 21 feet high, 26 feet wide, the roof being about 30 feet below the surface of the river; cost \$6,250,000. Pop. (1911), 130,832.

Birmingham (bir'ming-ham), a city and capital of Jefferson county, Alabama, and the most important seat of the iron industry in the South. It is 95 miles N. W. of Montgomery, in the center of an important coal and iron-mining region. Iron Mountain, 12 miles distant, contains very rich hematite deposits. The city has numerous blast furnaces, rolling mills, steel works, and its population increased from 13,000 in 1880 to 38,415 in 1900 and 132,880 in 1910.

Birmingham, a great manufacturing city of England, situated on the small river Rea near its confluence with the Tame, in the N. W. of Warwickshire, with suburbs extending into Staffordshire and Worcestershire, 112 m. N. W. of London, and 97 s. of Liverpool. It is the principal seat of hardware manufacture in Britain, producing metal articles of all kinds, from pins to steam-engines. It manufactures firearms in great quantities, sword-jewelry, buttons, tools, steel pens, lamps, bedsteads, gas-fittings, sewing machines, articles of papier-maché, way-carriages, etc. The quantity of

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gold and silver plate manufactured is large. Electroplating, first established in 1841, is one of the leading trades. Japanning, glass manufacturing, and glass-staining or painting form important branches of industry, as also does the manufacture of chemicals. At Soho in the vicinity of the town are the famous works founded by Matthew Boulton and James Watt, who there manufactured their first steam-engines, and where gas was first used, plating perfected, and numerous novel applications tried and experiments made. Among the public buildings are the Town Hall, a handsome building of the classic style, the Free Library (of which the central part was burned in 1879, when the irreplaceable Shakespeare library, and the collection of books, prints, etc., bearing on the antiquities of Warwickshire, were destroyed), the Midland Institute and Public Art Gallery, the Council House, etc. The finest ecclesiastical building is the Roman Catholic cathedral, designed by Pugin. The principal educational establishments are Queen's College, and the Mason Scientific College, merged in Birmingham University, 1898-1900; the Free Grammar School; and a school of art and design. Birmingham is known to have existed in the reign of Alfred, in 872, and is mentioned in the Domesday Book (1086) by the name of *Bermingeham*. Another old name of the town is *Bromwychem*, a form still preserved very nearly in the local pronunciation *Brummagem*. It became a city by royal grant in 1888. The population is (1911) 525,960.

Birnam, a hill in Perthshire, Scotland, 1324 feet $\pm$, once covered by the royal forest immortalized by Shakespeare in *Macbeth*.

Birney, JAMES G., abolitionist, was born in Kentucky in 1792; died in 1857. In 1834 he emancipated his slaves and advocated the abolition of slavery. Settling in Cincinnati, he edited *The Philanthropist*, its office being mobbed several times and finally destroyed. In 1840 and 1844 he was candidate of the Liberty party for president, his candidacy (1844) depriving Henry Clay of the electoral votes of New York and Michigan, thereby electing Polk.

Birrell (bir'el), AUGUSTINE, an English author and statesman, born near Liverpool 1850; member of Parliament 1899-1906; professor of law in University College, London, 1896-99; Chief Secretary for Ireland, 1907-16. His writings include *Obiter Dicta*, *Life of Charlotte Brontë*, *Res Judicata*, and other works.

Birsk, a town in Orenburg govern-
ment, Russia; founded in the

16th century as an outpost against Bash-
kir invasion. Pop. 9000.

Birs Nimrud, a famous mound in Babylonia, on the west side of the Euphrates, 6 miles S. W. of Hillah, generally regarded as the remains of the Biblical Tower of Babel.

Birstal, a mining and manufacturing town of Yorkshire, England. It has woolen mills. Pop. 7117.

Birth, or **LABOR**, in physiology, is the act by which a female of the class *Mammalia* brings one of her own species into the world. When the foetus has remained its due time in the womb, and is in a condition to carry on a separate existence, it is extruded from its place of confinement, in order to live the life which belongs to its species, independently of the mother. The period of gestation is very different in different animals, but in each particular species it is fixed with much precision. At the end of the thirty-ninth or the beginning of the fortieth week the human child has reached its perfect state, and is capable of living separate from the mother; hence follows in course its separation from her; that is, the birth. Contractions of the womb gradually come on, which are called, from the painful sensations accompanying them, *labor-pains*. The contractions of the womb take place in the same order as the enlargement had previously done, the upper part of it first contracting, while the mouth of the womb enlarges and grows thin, and the vagina becomes loose and distensible. By this means the foetus, as the space within the womb is gradually narrowed, descends with a turning motion towards the opening, and some time after the head of the child appears and the rest of the body soon follows. An *artificial birth* is that which is accomplished by the help of art, with instruments or the hands of the attendant. *Premature birth* is one which happens some weeks before the usual time; namely, after the seventh and before the end of the ninth month. Abortion and miscarriage take place when a foetus is brought forth so immature that it cannot live. They happen from the beginning of pregnancy to the seventh month, but most frequently in the third month. Abortion is the term given to premature expulsion before the third month of gestation, miscarriage from the third to the seventh month.

Birth Mark. See *Nævus*.

Birthright, any right or privilege to by birth, such as an estate descendible by law to an heir or civil liberty under a free constitution. See *Primogeniture*.

Birthroot, a name of *Trillium erectum* and other American plants of the same genus, having roots said to be astringent, tonic, expectorant, and antiseptic.

Birthwort (*Aristolochia clematilis*), a European shrub so called from the supposed services of its root when used medicinally in parturition.

Bisaccia (bè-sach'á), an Italian town, prov. of Avellino, 30 m. E. N. E. of Avellino in the Apennines. Pop. 7439.

Bisacquino (bis-ak-kwè'nò), a town of Sicily, prov. Palermo. Pop. 9016.

Bisalnagar (bis-al-nág'ar), a town of India, 120 miles N. N. W. of Baroda, has manufacturers of cotton and a transit trade. Pop. 20,000.

Bisalpur (bè-sal-pör'), a town of India, N. W. Provinces, 24 m. east of Bareilly. Pop. 10,000.

Bisbee, a city in Arizona, Cochise county. Copper mining and smelting are the main industries. Pop. (1910) 9019.

Biscay (bis'ká; Spanish *Viscaya*), a province of Spain near its northeast corner, one of the three Basque provinces (the other two being Alava and Guipuzcoa), area 836 sq. miles. The surface is generally mountainous; the most important mineral is iron, which is extensively worked; capital Bilbao. Pop. 348,684.

Biscay, BAY OF, that part of the Atlantic which lies between the projecting coasts of France and Spain, extending from Ushant to Cape Finisterre, celebrated for its dangerous navigation.

Bisceglie (bè-shel'yä), a seaport of Italy, province of Bari, on the w. shore of the Adriatic, containing a 12th century cathedral and ruins of an old Norman castle. The neighborhood produces good wine and excellent currants. Pop. 30,885.

Bischof (bish'of), KARL GUSTAV, German chemist and geologist, born at Nürnberg in 1792; died at Bonn in 1870. He was appointed professor of chemistry at Bonn in 1822. He published in London, 1841, *Researches on the Internal Heat of the Globe* (in English); but his chief work is the *Lehrbuch der chemischen und physikalischen Geologie*, 1847-54.

Bischoff (bish'of), THEODOR LUDWIG WILHELM, German anatomist and physiologist, born in Hanover in 1807; died at Munich in 1882. He became professor of comparative and pathological anatomy at Heidelberg in 1836; of anatomy at Giessen in 1844; and from

1855 to 1878 he occupied the chair at Munich. He was the author of several treatises, and gained distinction by his researches in embryology.

Bischweiler (bish'vî-lér), a town of Germany, Alsace, 12 miles N. of Strasburg, on the Moder, with flourishing manufacture of cloth. A great hop market is held in the autumn. Pop. (1910) 8145.

Bischofswerda, a town of Germany, in the kingdom of Saxony, governmental district of Bautzen. There are a number of manufacturing industries, and in the neighborhood extensive granite quarries. Scene of a battle on May 12, 1813, between the French and the Allies, after Napoleon's retreat from Moscow. Pop. 7465.

Biscuit (bis'két; Fr. 'twice-baked'), a kind of hard, dry cake which is not liable to spoil when stored. More than a hundred different sorts of biscuits are manufactured, and owing to the immense demand manual labor has long since been superseded in the works by machinery. In making biscuits the flour is mixed with water, worked into dough, kneaded with rollers, cut, stamped, conveyed on a frame drawn by chains through an oven at both ends, and thence passed to a drying room—all without being touched by hand. In many fancy biscuits the process is of course more elaborate, but even these machinery plays an important part. *Meat biscuits* are made of flour mixed with the soluble elements of meat.

Biscuit, in pottery, a term applied to porcelain and other earthenware after the first firing and before the final firing. At this stage it is porous and is used for wine-coolers, etc.

Bise (bèz), a keen northerly wind prevalent in the north of the Mediterranean.

Bisharin (bi-shá-rén'), a race inhabiting Nubia, between the Nile and the Red Sea, somewhat resembling the Bedouins, and living by pasturage. They are Mohammedans by religion, yet are said to preserve traces of animism and worship. Linguistically and geographically they form a connecting link between the Hamitic populations and the Egyptians.

Bishnupur (bish-nu-pör'), a town of India, Bankura district, with manufactures of cotton and fine silk cloth and a brisk trade. Pop. about 18,000.

Bishop, the highest of the three orders in the Christian ministry—bishops, priests, and deacons—in some churches as recognize three grades. The name is derived from the Greek *episkopos*.

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meaning literally an overseer, through the A. Saxon *biscop*, *biscep*. Originally in the Christian church, the name was used interchangeably with *presbyter* or *elder* for the overseer or pastor of a congregation; but at a comparatively early period a position of special authority was held by the pastors of the Christian communities belonging to certain places, and the name of bishop became limited to these by way of distinction. There is much that is doubtful or disputed in regard to the history of the episcopal office. Roman Catholics and many others hold that it is of divine ordination and existed already in apostolic times; and they maintain the doctrine of the apostolical succession; that is to say, the doctrine or the transmission of the ministerial authority in uninterrupted succession from Christ to the apostles, and through these from one bishop to another. Presbyterians deny that the office was of divine or apostolic origin, and hold that it was an upgrowth of subsequent times easily accounted for, certain of the presbyters or pastors acquiring precedence as bishops over others, just as the bishops of the chief cities (Jerusalem, Antioch, Alexandria, Constantinople, Rome) obtained precedence among the bishops and received the title of metropolitan bishops; while the bishop of Rome came to be regarded as the head of the church and the true successor of Peter. According to Cyprian, bishops were in the earliest times chosen by the people, subject to a veto by the bishops of the province. In the year 325 the first Nicene Council recommended appointment by the provincial bishops subject to confirmation of their choice by the metropolitan. In the 11th century the right of election passed to the cathedral chapter, and the pope gradually engrossed the sole right of confirmation, until finally Clement V and his successors claimed the right absolutely. At present in the Roman Catholic Church the bishop is usually selected by the pope from a number of priests whose names have been submitted by the chapter connected with the cathedral church. When the monarch is Roman Catholic a bishopric may be in the royal gift, subject to papal approval. The bishop comes next in rank to the cardinal. His special insignia are the mitre and crozier or pastoral staff, a jeweled ring, the pectoral cross, etc. He guards the purity of doctrine in his diocese, ordains and appoints the clergy, consecrates churches, and is the court of appeal for the lower orders of the clergy. The bishops of the Greek Church have similar functions, but on the whole less authority. They are always selected from the monastic orders.

In the Church of England bishops are

Bishop

nominated by the sovereign, who, upon request of the dean and chapter for leave to elect a bishop, sends a *congé d'élire*, or license to elect, with a letter missive, nominating the person whom he would have chosen. The election, by the chapter, must be made within twelve days, or the sovereign has a right to appoint whom he pleases. Bishops in the Protestant Episcopal Church in the United States are chosen by the general convention of clerical and lay deputies of the diocese over which they are to preside. In all, the bishops of England now number thirty-five, with thirty-seven suffragan and assistant bishops. In the disestablished church of Ireland there are eleven bishops, and seven in the Scottish Episcopal Church. There are also about eighty-one British colonial and eleven missionary bishops belonging to the Anglican Church. Of Roman Catholic bishops there are about 800. In the United States the Protestant Episcopal Church has over one hundred bishops, the R. Catholic Church eighty-eight. In the states there are also the bishops of the Methodist Episcopal Church, altogether sixty-one in number.

The United Brethren in Christ maintain the episcopal form of government, electing bishops whose duties correspond to those of the Methodist Episcopal church. Eight bishops are elected quadrennially by the General Conference.

The United Evangelical Church, in a General Conference of clerical and lay delegates elects two bishops with duties the same as the above.

In the Reformed Episcopal Church a bishop is a chief presbyter among his equals by virtue of his election only; the bishopric being an executive office and not an order. In the United States there are six Reformed Episcopal bishops.

Among the Lutherans and the Moravians the office of bishop has survived.

Bishops in partibus infidelium (in parts occupied by the infidels), in the Roman Catholic Church, are bishops consecrated under the fiction that they are bishops in succession to those who were the actual bishops in places where Christianity has become extinct. *Suffragan* bishops are bishops consecrated to assist other bishops in overtaking the duties of their dioceses. They differ from *coadjutor bishops*, likewise appointed to assist other bishops, in having no power to exercise jurisdiction.

Bishop, ISABELLA, traveler and writer, born in Yorkshire, England, in 1832. She traveled for many years in America and Asia and in 1892 was elected the first woman fellow of the Royal Geographical Society. She lectured widely and engaged in philanthropic work, building five hospitals and an orphanage in the

Bishop

East. She wrote *Unbeaten Tracks in Japan, Korea and Her Neighbors, Among the Tibetans, The Yangtze Valley and Beyond*, etc. She died in 1904.

Bishop, SIR HENRY ROWLEY, musical composer, born in London in 1786, and trained under Bianchi, composer to the London Opera House. In 1809, his first opera, the *Circassian's Bride*, was produced at Drury Lane. His name lives in connection with many glees, songs and smaller compositions, but probably most in his setting to music of *Home, Sweet Home*. From 1810 to 1824 he acted as musical composer and director to Covent Garden Theater. Shortly after the accession of Queen Victoria he was knighted. He was elected Reid professor of music in Edinburgh University in 1841, and in 1848 professor of music in the University of Oxford. He died in 1855.

Bishop-Auckland, a town of England, County Durham; with cotton factories and engineering works; and important coal mines in the neighborhood. The palace of the Bishop of Durham is here. Pop. 13,839.

Bishop-Stortford, a town of England, County Hertford, on the river Stort; trade chiefly in grain and malt. Pop. 8723.

Bishop-weed (*Egopodium podagraria*), an umbelliferous plant of Europe, with thrice-ternate leaves and creeping roots or underground stems, a great pest in gardens from its vigorous growth and the difficulty of getting rid of it; called also *Goutwort*, *Herb Gerard*, etc. Also a name of plants of the genus *Ammi*, and in the United States to an umbelliferous plant, *Ptilimnium capillareum*.

Biskara, or BISKRA (bis'ka-rà or bis'krà), a town of Algeria, the chief military post of the Sahara, with an important caravanserai. The oasis of Biskra contains about 180,000 date palms, with groves of olives, etc. Pop. of oasis, 10,413.

Biskuptiz, village in Silesia, Prussia, with large iron works. Pop. (1910) 15,252.

Bisley, a village in Surrey, England, the present place of the annual meeting of the National Rifle Association, formerly held at Wimbledon. Pop. 5210.

Bismarck (biz'mark), a city, capital of North Dakota, on the Missouri River. The city has several federal institutions and the state capitol and penitentiary, a government Indian school, Fort Lincoln, etc. It is on the main line of the Northern Pacific railway. Pop. 6800.

Bismarck, HERBERT FÜRST VON, a German statesman, son of Prince Otto von Bismarck, born 1849.

Bismarck-Schönhausen

From 1896 to 1899 he was secretary of state for foreign affairs, an office he resigned at the time his father quit the post of chancellor. Died 1904.

Bismarck Archipelago, the name given by the Germans to New Britain, New Ireland, and other islands adjoining the portions of New Guinea. The archipelago was taken by Australian forces in September, 1914, during the European war.

Bismarck Mountains, a range in New Guinea, reaching a height of 15,000 ft.

Bismarck-Schönhausen (bis'mark shon'hau-zén), OTTO EDUARD LEOPOLD, PRINCE VON; born of a noble family of the 'Mark' (Brandenburg), at Schönhausen April 1, 1815; studied at Göttingen, Berlin, and Greifswald; entered the army and became lieutenant in the Landwehr. After a brief interval devoted to his estates and to the office of inspector of dikes, he became, in 1847, a member of



Bismarck.

the Prussian diet. In 1851 he was appointed representative of Prussia in the diet of the German Federation at Frankfurt, where with brief interruptions he remained till 1859, exhibiting the highest ability in his efforts to checkmate Austria and place Prussia at the head of the German states. From 1859-62 he was ambassador to St. Petersburg, and in the latter year, after an embassy to Paris of five months' duration, was appointed first minister of the Prussian crown. The Lower House persistently refusing to pass

the bill for the reorganization of the army, Bismarck at once dissolved it (Oct., 1862), closing it for four successive sessions until the work of reorganization was complete. When popular feeling had reached its most strained point the Schleswig-Holstein question acted as a diversion, and Bismarck—by the skillful manner in which he added the duchies to Prussian territory, checkmated Austria, and excluded her from the new German confederation, in which Prussia held the first place—became the most popular man in Germany. As chancellor and president of the Federal Council he secured the neutralization of Luxemburg in place of its cession by Holland to France; and though in 1868 he withdrew for a few months into private life, he resumed office before the close of the year. A struggle between Germany and France appearing to be sooner or later inevitable, Bismarck, having made full preparations, brought matters to a head on the question of the Hohenzollern candidature for the Spanish throne. Having carried the war to a successful issue, he became chancellor and prince of the new German empire. Subsequently, in 1872, he alienated the Roman Catholic party by promoting adverse legal measures and expelling the Jesuits. He then resigned his presidency for a year, though still continuing to advise the emperor. Towards the close of 1873 he returned to power, retaining his position until in March, 1890, he disagreed with Emperor William II, and tendered his resignation. On his retirement the title of Duke of Lauenburg was conferred on him. In 1878 he presided at the Berlin Congress. Died July 30, 1898.

Bismuth (bis'muth), a metal of a silvery white color, with a faint red tinge. Chemical symbol Bi; atomic weight 208.5. It is found native, and exists also in combination with other elements. When melted in the process of production, it solidifies with a crystalline texture; crystallizing when pure more readily than any other metal. It shows the singular anomaly, that when subjected to great pressure its density becomes less. It repels a magnet more than any other metal. It unites readily with other metals to form alloys, one known as fusible metal, consisting of bismuth, lead and tin, having the remarkable property of melting in boiling water, its melting point being 200.75° F., or 12° below the boiling point of water. The specific gravity of bismuth is 9.83; it melts at 507° F. Bismuth enters into several compounds used in the arts, one of the most important being the trioxide, Bi₂O₃. It is employed in porcelain manufacturing for the purpose of giving a peculiar colorless, irised

luster. It is also used in the manufacture of glass and for making paste jewelry (strass). One form of bismuth, the subnitrate or basic nitrate, called pearl white, pearl powder, etc., is used in the preparation of cosmetics. In therapeutics the subnitrate and subcarbonate are employed in various forms of gastro-intestinal disturbance. The main source of supply of bismuth has been Schneeberg in Saxony, where it occurs in combination with ores of cobalt, arsenic, and silver. It is also found in the Erzgebirge, between Saxony and Bohemia, in France, in South America and in New South Wales.

Bison (bi'son or bis'on), the name applied to two species of ox. One of these, the European bison or aurochs (*Bos bison* or *Bison europæus*), is now nearly extinct, being found only in the forests of Lithuania and the Caucasus. The other, or American bison, improperly termed buffalo (*Bison americanus*), found only in the region lying north and south between the Great Slave Lake and the Yellowstone River, and in parts of Kansas and Texas. It has become extinct in the wild state, though formerly to be met with in immense herds. The two species closely resemble each other, the American bison, however, being, for the most part, smaller, and with shorter and weaker hindquarters. The bison is remarkable for the great hump or projection over its shoulders, at which point the adult male is almost six feet in height; and for the long, shaggy, rust-colored hair over the head, neck, and forepart of the body. The American bison used to be much hunted for sport as well as for its flesh and skin, and to overhunting its destruction is due. There remain only a few small herds in captivity. The flesh of the bison is rather coarser grained than that of the American ox, but it was considered by hunters and travelers as superior in tenderness and flavor. It is estimated that the annual rate of destruction of this noble and valuable animal, between 1870 and 1872, was 2,500,000 head.

Bispham (bis'pam), DAVID SCULL, an American singer (1857-). He was born in Philadelphia, Pa., and educated at Haverford College. He studied in Florence and began his operatic career in 1891 at the Royal English Opera in London. He sang the principal baritone rôles in the German, Italian and English operas at the Royal Opera, Covent Garden, London, and the Metropolitan Opera House, New York City. He achieved celebrity as a concert singer and added dramatic readings to his programs, and was the first of the great singers to employ English translations in his recitals of German songs.

Bisque (blsk), a kind of unglazed white porcelain used for statuettes and ornaments.

Bissagos (bis-sil'gos), a group of about thirty islands near the w. coast of Africa, opposite the mouth of the Geba, between lat. 10° and 12° N. The largest, Orango, is about 25 miles in length, and most of them are inhabited by a rude negro race, with whom some trade is carried on. Most of the islands are under native chiefs nominally vassals of Portugal. At Bolama, or Bulama, once a British settlement. There is a Portuguese town, a thriving and pleasant place, the seat of government for the Portuguese possessions in this quarter.

Bissell (bis'sel), GEORGE EDWIN, an American sculptor, born in Connecticut in 1839. Served in the Civil war, and studied in Paris. Examples of his work are a soldiers' and sailors' monument, a statue of Abraham Lincoln in Edinburgh, Scotland, and a statue of President Arthur in Madison Square, New York.

Bissen, WILHELM, a Danish sculptor, born in 1798; died in 1868. He studied at Rome under Thorwaldsen, who in his will appointed Bissen to complete his unfinished works and take charge of his museum. Bissen's own works include a classic frieze of several hundred feet for the palace-hall at Copenhagen, an Atalanta hunting, Cupid sharpening his arrows, etc.

Bissextile. See *Leap-year*.

Bistort (*Polygonum bistorta*), a perennial plant of the buckwheat family (*Polygonaceae*), found in Britain, and from its astringent properties (it contains much tannin) sometimes used medicinally. It is also called adder's-wort and snakeweed. An allied dwarf species of alpine and arctic regions is *P. viviparum*, alpine bistort.

Bistritz, a town of Austria-Hungary, in Transylvania; in medieval times a place of large commerce. Pop. 12,081.

Bitanhol (be-tän-höl'), a tree, *Calophyllum inophyllum*, widely distributed in tropical regions, yielding an aromatic resin, and from its seeds a bitter oil. Also called St. Mary's wood.

Bithoor, BITHUR (bit-hör') or BITTOOR, a town of India, N. W. Provinces, 12 miles N. W. of Cawnpore, on the Ganges, long the abode of a line of Mahratta chiefs, the last of whom died without issue in 1851. His adopted son, Nana Sahib, who claimed the succession, was the instigator of the massacre at Cawnpore. Pop. (1901) 7173.

Bithynia (bi-thin'ia), an ancient territory in the N. W. of Asia Minor, on the Black Sea and Sea of Marmora, at one time an independent kingdom, later a Roman province. The cities of Chalcedon, Heraclea, Nicomedia, Nicaea, and Prusa were in Bithynia.

Bitlis. See *Betlis*.

Bitonto (bē-ton'tō), a town of Italy, province of Bari, the seat of a bishop, with a handsome cathedral. The environs produce excellent wine. Pop. 80,617.

Bitsch (bich), a town in the north of Alsace-Lorraine, in a pass of the Vosges, having a strong citadel on a hill. Pop. (1906) 4000.

Bittacomorpha (bit-a-kō-mor'fū), a remarkable American genus of dipterous insects, family *Tipulidae*, with short wings, banded legs and swollen feet. The larvae are sub-aquatic. The respiratory tube of the pupa projects from the opposite end of the body.

Bittacus (bit'a-kus), a genus of mecopterous insects, of wide distribution and predatory habits, resembling the crane-fly. They make use of the hind legs for seizing their prey. Their larvae live near the surface of the ground and feed on dead animal matter.

Bitter, KARL THEODORE FRANCIS, an American sculptor, born in Vienna in 1867. His work is chiefly monumental, being exhibited in such works as *Elements Controlled and Uncontrolled*, for the Chicago Exposition, and the large relief *Triumph of Civilization*, in the Pennsylvania Railway passenger station at Philadelphia.

Bitterfeld (bit'ter-felt), town in Prussian Saxony, on the Mulde, with manufactures of cloth, pottery, etc. Pop. 11,839.

Bitter-king, the *Soulamēa amāra*, a tree of the quassia order, peculiar to the Moluccas and Fiji Islands, the root and bark of which, bruised and macerated, are used in the East as an emetic and tonic.

Bitter Lakes, salt lakes on the line of the Suez Canal.

Bitterling, a cyprinoid fish, *Rhodeus amarus*, resembling the bream, inhabiting the fresh waters of Central Europe.

Bittern, the name of several grallatorial birds, family *Ardeidae* or herons, genus *Botaurus*. The common bittern is about 28 inches in length, about 44 in extent of wing; general color, dull yellowish brown, with spots and bars of black or dark brown; feathers on the

breast long and loose; tail short; bill about 4 inches long. It is remarkable for its curious booming or bellowing cry. The eggs (greenish brown) are four or five in number. The American bittern (*B. lentiginosus*) has some resemblance to the common European bittern, but is smaller.

Bittern, the syrupy residue from evaporated sea-water after the common salt has been taken out of it. It is used in the preparation of Epsom salt (sulphate of magnesia). It was in this liquor that Balard is said to have discovered bromine in 1826.

Bitter-nut, a tree of North America, of the walnut order, the *Hicoria minima*, or swamp-hickory, which produces small and somewhat egg-shaped thin-shelled nuts; the kernel is bitter and uneatable.

Bitter Root Range, a mountain boundary line between Idaho and Montana. It belongs to the Rocky Mountain system, and has an altitude ranging between 9000 and 10,000 feet.

Bitters, the name given to aromatized beverages (generally alcoholic) containing some bitter vegetable substance. Gentian, bitter orange rind, angostura, rhubarb, cascarrilla, quassia, cinchona, are all employed in the preparation of the various kinds of bitters. Caraway, cinnamon, juniper, cloves and other aromatics often are used in conjunction with the bitter principle with alcohol and sugar. Some bitters are prepared by maceration and filtration, others by distillation. Their alcoholic strength varies, but is generally about 40 per cent of alcohol.

Bittersweet, the woody nightshade, *Solanum dulcamara* (see *Nightshade*).

Bittervetch, a name applied to two kinds of leguminous plants: (a) *Vicia ervilia*, a lentil cultivated for fodder; and (b) all the species of *Orobus*, e.g. the common bittervetch of Britain, and *O. tuberosus*, a perennial herbaceous plant with racemes of purple flowers and sweet, edible tubers.

Bitterwood, the timber of *Xylopia glabra* and other species of *Xylopia*, order *Anonaceae*, all noted for the extreme bitterness of the wood. The name is also given to other bitter trees, as the bitter-ash.

Bitumen (bi-tū'men), a substance of a resinous nature, composed principally of hydrogen and carbon and appearing in a variety of forms which pass into each other and are known by different names, from *naphtha*, the most fluid, to *petroleum*, a liquid mass, which

is less so, thence to *malthe* or *mineral tar*, which is more or less cohesive, and finally to *asphaltum* and *elastic bitumen* (or *elaterite*), which are solid. It burns like pitch, with much smoke and flame. It consists of 84 to 88 of carbon and 12 to 16 of hydrogen, which is essentially the composition of naphtha and petroleum. The other forms contain also a certain amount of oxygen, which is particularly the case in asphalt, some specimens of which showing as much as 10 per cent. The degree of solidity in fact seems to be proportionate to the amount of oxygen present. It is a very widely spread mineral, and is now largely employed in various ways. As the binding substance in mastics and cements it is used for making roofs, arches, walls, cellar-floors, etc., water-tight, for street and other pavements, and in some of its forms for fuel and for illuminating purposes.

Bituminous (bi-tū'mi-nus) SHALE or SCHIST, an argillaceous shale impregnated with bitumen and very common in the coal-measures. It was largely worked for the production of paraffin, etc.

Bituriges (bi-ter'i-jēs), a Celtic people, who, according to Livy, were the most powerful in Gaul in the time of Tarquinus Priscus. They divided into two branches, the Bituriges Cubi and Bituriges Vivisci. The Bituriges Cubi (the Bituriges of Cæsar) inhabited the modern diocese of Bourges, including the departments of Cher and Indre, and partly that of Allier. Their chief towns were Avaricum (Bourges), Argentomagus (Argenton-sur Creuse), Neriomagus (Néris-les-Bains) and Noviodunum (probably Villate). They were conquered by Cæsar, and under Augustus they were incorporated in Aquitania.

Bitzins (bit'se-us), ALBERT, a popular Swiss author, better known by his pseudonym of Jeremias Gotthelf, born in 1797; died in 1854. His chief works were his *Sorrows and Joys of a Schoolmaster*, 1838-1839, *Grandmother Katy*, 1848; *Uli the Farm-servant*, 1841, and *Uli the Farmer*, 1850; *Stories and Pictures of Popular Life in Switzerland*, 1851.

Bivalves (bi'valvz), molluscous animals having a shell consisting of two halves or valves that open by an elastic hinge and are closed by muscles; as the oyster, mussel, etc.

Bivouac (biv'u-ak), the encampment of soldiers in the open air without tents, each remaining dressed and with his weapons at hand. It was the regular practice of the French revolutionary armies, but is only desirable

where great celerity of movement is required.

Biwa Lake (bi-wa), the largest lake in Japan, in the province of Omi. It is justly celebrated for the beauty of its scenery. It is 36 miles long, 12 in extreme width and of about 300 ft. maximum depth.

Bixio, NINO, an Italian soldier who greatly distinguished himself in Italy's struggle for liberty. He was born in 1821, and died in 1873.

Bizerta (bi-zér'tà), or BENZERT, a seaport of Tunis, the most northern town of Africa, with a channel communicating with the Lake of Bizerta, a fine, deep, salt-water lagoon teeming with fish, inland from and connected with which is a fresh-water lake. It is an important naval station of France. The country around is beautiful and fertile. Pop., chiefly Arab., about 12,000.

Bizet (bi-zà), ALEXANDRE CÉSARE LÉOPOLD (called GEORGES), a French musical composer, was born in 1838 near Paris; died at Paris June 3, 1875. His first two operas *Les Pêcheurs de Perles* and *La Jolie Fille de Perth*, did not meet with much success. Better fortune attended his production of the incidental music to Alphonse Daudet's drama *L'Artésienne*, which arranged in the form of suites has a frequent place on modern programmes. It was reserved for his master piece, the opera *Carmen*, a dramatization by Meilhac and Halévy of Mérimée's novel, to bring to Bizet the fame to which he was entitled; and it was in the enjoyment of the first fruits of this fame that he died at the age of 37.

Bjelbog (byel'bog), in slavonic mythology the pale or white god, as opposed to Tchernibog, the black god, or god of darkness.

Björneborg (bycur'ne-borg), a seaport of Finland on the Gulf of Bothnia. Pop. (1904) 16,053.

Björnson, BJORNSTJERNE (byeurn'-styern byeurn'son), a Norwegian novelist, poet, and dramatist, born in 1832. He entered the University of Christiania in 1852, and he speedily became known as a contributor of articles and stories to newspapers and as a dramatic critic. From 1857 to 1859 he was manager of the Bergen theater, producing during that time his novel *Arne* and his tragedy of *Halte Hulda*. The democratic tendencies to be found in his novels found a practical outcome in the active part taken by him in political questions bearing upon the Norwegian peasantry and popular representation. Among his tales and novels are: *Synnøve Solbakken*; *The Fishermiden*; *A Happy Boy*; *Railways and Churchyards*. Among his dramatic pieces are: *The Newly-*

Married Couple; *Mary Stuart in Scotland*; *A Bankruptcy*, etc. He also wrote poems and songs. He died in 1910.

Black, HUGH. An eminent theologian, born at Rothesay, in Buteshire, Scotland, on March 26, 1808. Was educated in the Rothesay Academy and received the degree of A.M. from the University of Glasgow in 1837. Was ordained in the Free Church of Scotland in 1831, and filled the ministry in St. George's United Free Church, Edinburgh, from 1836 to 1903, since which year he has held the office of practical theology in the Union Theological Seminary, New York City. He was delegate to the International Congress of Science and Art at the Louisiana Purchase Exposition, St. Louis, 1904. He is the author of *The Dream of Youth*, *Friendship, Culture and Restraint*, *Work*, *The Practice of Self-Culture*, etc.

Black, JEREMIAH S., born in Somerset Co., Pennsylvania, in 1810; died at York, Pa., in 1883. He became a lawyer; was elected a judge of the supreme court of the state in 1851, and 1854; was attorney-general under President Buchanan 1857-60, and secretary of state, 1860-61.

Black, JOSEPH, a distinguished chemist, born at Bordeaux, of Scottish parents, in 1728; died in 1799. He entered Glasgow University and studied chemistry under Dr. Cullen. In 1754 he was made Doctor of Medicine at Edinburgh, at Glasgow in 1756, and again at Edinburgh in 1766. In his *Experiments on Magnesia*, *Quicklime* and other *Alkaline Substances*, he made known his important discovery of 'fixed air' (carbonic acid gas), in which he preceded the discoveries of Priestley, Cavendish, and Lavoisier concerning the constituents of the atmosphere. His fame, however, chiefly rests on his theory of 'latent heat,' 1757 to 1763.

Black, WILLIAM, novelist, born at Glasgow in 1841, first studied art, but eventually became connected with the Glasgow press. In 1864 he went to London, and in the following year joined the staff of the *Morning Star*, for which he was special correspondent during the Franco-Austrian war of 1866. His early novel, *Love or Marriage*, 1867, was only moderately successful, but his *In Silk Attire*, *Kilmory*, *A Princess of Thule*, and especially *A Daughter of Heth* (1871), gained him an increasingly wide circle of readers. After a period of editorial work on the *Daily News* he resumed the writing of fiction and added largely to his list of novels. He died Dec. 10, 1898.

Black Art. See *Magic*.

Black-assize

Black-assize, the popular name of a fatal pestilence which broke out at Oxford, England, at the close of the assizes of 1363, and was considered by the people a judgment of heaven on a cruel sentence. From July 6 to August 12 more than 300 persons died in or near Oxford, including the judges, most of the jurymen and many members of the University.

Black-band, a valuable kind of clay iron-stone containing from 10 to 30 per cent of coaly matter, from which most of the Scotch iron was obtained.

Black-beer, a kind of beer of a black color and syrupy consistence made at Dantzic.

Black-beetle, a popular name for the *Blapsidæ*, cockroach. See also *Blapsidæ*.

Blackberry, a popular name of the *Rubus* genus or the berry itself. In the United States the fruit has been largely improved by cultivation and is used as a table berry and in pastry and also in making a blackberry wine and brandy.

Blackbird (*Turdus merula*), called also the merle, a well-known species of thrush, common throughout Europe. It is larger than the common thrush, its length being about 11 inches. The color of the male is a uniform deep black, the bill being an orange-yellow; the female is of a brown color, with blackish-brown bill. The song is rich, mellow, and flute-like, but of no great variety of compass. Its food is insects, worms, snails, fruits, etc. The blackbirds or crow blackbirds of America are quite different from the European blackbird, and are more nearly allied to the starlings and crows. See *Crow-blackbird*. The red-winged blackbird (*Agelaius phoeniceus*), belonging to the starling family, is a familiar American bird.

Black-boy, a name for the grass-trees (*Xanthorrhæa*) of Australia yielding a gum or resin called black-boy resin or akaroid resin.

Blackburn, a manufacturing town and parliamentary borough of England, Lancashire, 21 miles N. N. W. from Manchester. It has a free grammar school, founded by Queen Elizabeth in 1557 and a free school for girls, founded in 1765. In its ownership of public utilities it is prominent among modern municipalities. Blackburn is one of the chief seats in the world of the cotton manufacture, there being a very large number of mills as well as works for making cotton machinery and steam engines. Coal formerly abounded in the vicinity. Pop. (1911) 133,064.

Black Fly

Blackcap (*Sylvia atricapilla*), a European passerine bird of the warbler family, 6 inches long, upper part of the head black, upper parts of the body dark gray with a greenish tinge, under parts more or less silvery white. The female has its hood of a dull rust color. The blackcap is met with in England from April to September. It ranks next to the nightingale for sweetness of song. The American blackcap is a species of titmouse (*Parus atricapillus*) so called from the coloring of the head. The American black-capped fly-catching warbler, *Myiodiocetes pusillus*, and the black-headed gull, *Larus ridibundus*, are also given the name of black-cap.—The term is likewise popularly applied to the plant and fruit of the black-fruited raspberry, *Rubus occidentalis*, growing wild in many portions of the United States, and also extensively cultivated.—A name of the cattail reed, *Typha latifolia*.

Black Chalk, a soft variety of argillaceous, laccous slate, containing a variable per cent of carbon, and used for drawing.

Black Cock, the heathcock, the male of the black grouse. See *Grouse*.

Black Death. See *Plague*.

Black Draught, sulphate of magnesia and infusion of senna, with aromatics to make it palatable.

Blackfeet Indians, a tribe of American Indians, found in the United States and Canada, from the Yellowstone to Hudson Bay.

Blackfish, a name applied to a number of fishes. (a) A local English name of the female salmon about the time of spawning. (b) A name of the tautog, *Tautoga onitis*, a foodfish of the Atlantic coast. (c) A local Alaskan name of *Dallia pectoralis*, a fish which alone represents the suborder *Xenomi*. (d) A local name in New England of the common sea-bass, *Centropristes striatus*. (e) A name of a European scombroid fish, *Centrolophus pompilus*. (f) A local name in the Firth of Forth, Scotland, of the tadpole fish, *Raniceps trifurcatus*. (g) A name of three fishes of Australia: A sea-fish, *Inciiseus simplex*; a fresh-water fish, *Gadopsis marmoratus*; a sea-fish, *Girella tricuspidata*. The name is also given to several delphinoid cetaceans, especially of the genus *Globicephalus*.

Black Fly, the name of certain flies, *Simulium molestum*, whose bite is very troublesome to man and beast in the Northern United States and Canada.

Black Forest (German, *Schwarzwald*), a chain of European mountains in Baden and Württemberg, running almost parallel with the Rhine for about 85 miles. The Danube, Neckar, and other large streams rise in the Black Forest, which is rather a chain of elevated plains than of isolated peaks; highest summit, Feldberg, 4900 feet. The skeleton of the chain is granite, its higher points covered with sandstone. The principal mineral is iron, and there are numerous mineral springs. The forests are extensive, chiefly of pines and similar species, and yield much timber. The manufacture of wooden clocks, toys, etc., is the most important industry, employing many persons. The inhabitants of the forest are quaint and simple in their habits, and the whole district preserves its old legendary associations.

Black Friars, friars of the Dominican order; so called from their habit.

Black Friday, the name given to two days of financial disaster in American history. (1) Sept. 24, 1869, when a panic was caused in Wall St. by the daring effort of Fisk and Gould to corner the gold market, by buying up all the gold in the New York banks. This effort was frustrated by the government issuing gold. (2) Sept. 19, 1873, when a great financial crash took place in the New York Stock Exchange, followed by the panic of 1873. In England the name of Black Friday is given to two similar financial panics.

Black Fungi, an order of parasitic *oomycetes*, usually black in color. They include the *ergot* of rye, the *black-knot* of the plum-tree, etc.

Black Guard was a term used by the sixteenth century for the lowest menials of a noble house, the scullions who cleaned pots and pans. It was also applied to the hangers-on of an army, camp-followers, then a vagabond rabble. In its present form of blackguard it indicates a man of very disreputable character.

Black-gum (*Nyssa sylvatica*, order *Cornaceæ*, an American tree, yielding a close-grained, useful wood; fruit a drupe of blue-black color, whence it seems to get its name of 'black'; it has no gum. It is called also pepperidge, and has been introduced into Europe as an ornamental tree.

Black Hand, the name of and a symbol used by a society of Italian terrorists in the United States, which arose in the latter part of the 19th century. The methods of in-

timidation followed by its members were chiefly the use of blackmailing letters containing threats of personal violence or even death unless the demands of the blackmailers were complied with.

Black Hawk, a famous chief of the Sac and Fox Indians, born in 1767. He joined the British in 1812, and in 1831-32 opposed the removal of his tribe from Illinois and Wisconsin westward. A war followed, in which the Indians were soon subdued. He died in 1838.

Blackheath, a village and heath, England, Kent, about 6 miles S.E. of London Bridge. The common contains 267 acres within its present limits, and is much resorted to by pleasure parties. It has been the scene of many remarkable events, such as the insurrectionary gatherings of Wat Tyler and Jack Cade and the exploits of various highwaymen.

Black Hills, an elevated region in South Dakota and N. E. Wyoming, rich in timber and minerals, especially gold, of which large quantities have been mined. There are also large deposits of tin, but in a form not easily reducible. Harney's Peak, the second in height, is 7440 feet high. As a grazing country this region has no superior, and there is much fertile soil, while the climate is excellent. The approach to the Black Hills is through a region of inhospitable, treeless plains, with water too alkaline for use. This country was ceded to the government by the Dakota Indians in 1875, it having been previously largely invaded by miners.

Black Hole of Calcutta, a small chamber, 20 feet square, in the old fort of Calcutta, in which, after their capture by Surajah Dowlah, the whole garrison of 146 men were confined during the night of June 21, 1756. Only twenty-three survived. The spot is now marked by a monument.

Blackie, JOHN STUART, a Scottish writer, born at Glasgow in 1809; died in 1895. He passed as advocate at the Edinburgh bar in 1834, in which year appeared his metrical translation of *Faust*. In 1841 he was appointed to the chair of Latin literature in Marischal College, Aberdeen—a post held by him until his appointment to the Greek chair at Edinburgh in 1852, from which he retired in 1882. Both in writing and upon the platform his name was associated with various educational, social, and political movements. He published numerous works of interest to scholars and general readers.

Blackletter, the name commonly given to the Gothic characters which began to supersede the Roman characters in the writings of Western Europe towards the close of the twelfth century. The first types were in blackletter, but these were gradually modified in Italy until they took the later Roman shape introduced into most European states during the sixteenth century.

Blacklist, a list of bankrupts or other parties whose names are officially known as failing to meet pecuniary obligations, wilfully or otherwise.

Blacklock, THOMAS, a blind Scottish poet, born at Annan in 1721. He published a volume of poems in 1746 and subsequently entered the Scotch ministry. Died in 1791.

Blackmail, a certain rate of money, corn, cattle, or the like, anciently paid, in the north of England and in Scotland, to certain men who were allied to robbers, to be protected by them from pillage. It was carried to such an extent as to become the subject of legislation. Blackmail was levied in the districts bordering the Highlands of Scotland till the middle of the eighteenth century. In the United States, this term is applied to money extorted from persons under threat of exposure in print for an alleged offense; hush-money.

Black Monday. **Easter Monday**, April 14, 1360, when a great storm fell upon the army of Edward III, then lying before Paris, causing death to many men and horses.

Black Mountain, a mountain range and district on the Hazara border of the Northwest frontier province of India, inhabited by Yusufzai Pathans. Average height 8000 feet.

Black Mountains, the group in North Carolina which contains the highest summits of the Appalachian system. Mt. Mitchell being the highest peak, 6710 feet. See *Appalachian Mountains*.

Blackmore, RICHARD DODDRIDGE, novelist, born at Longworth, England, in 1825; educated at Tiverton School and Exeter College, Oxford, where he was graduated in 1847. In 1852 he was called to the bar at the Middle Temple, and afterwards practised as a conveyancer. Shortly afterwards he engaged in literary pursuits, publishing several volumes of verse, *Poems by Melanther*, *The Bugle of the Black Sea*, etc. These were followed by novels, *Clara Vaughan* (1864), *Oradock Nowell* (1866)

and his masterpiece *Lorna Doone, a Romance of Exmoor* (1869). This work had a very large sale and is classed among the great novels of recent times. *The Maid of Sker* (1872) comes next to it in interest, and was followed by several other novels. He had a passion for gardening, and plant life is depicted in his books with force and truth. He published a translation of Virgil's *Georgics* (1862 and 1871). He died January 21, 1900.

Black'more, SIR RICHARD, physician and writer in verse and prose, the son of an attorney in the county of Wilts; entered the University of Oxford in 1668; took the degree of M.D. at Padua, and was admitted Fellow of the Royal College of Physicians in 1687. In 1695 he published his heroic poem *Prince Arthur*, and two years later was knighted and appointed physician to William III. A ponderously worthy man, mediocre as a poet, he became the common butt of the day, though no amount of ridicule was sufficient to restrain his desire for literary distinction. His *Paraphrases on Job* (1700) was followed by *Eliza, an Epic in Ten Books* (1705) and by the *Nature of Man* (1711). His poem the *Creation* (1712) received the praise of Addison and Johnson; but his *Redemption*, in six books (1722), and his *Alfred*, in twelve (1723), reverted to the unrelieved monotony of his earlier style. He left several prose works on theology and medicine, and died in 1720.

Black'pool, a much-frequented watering-place of England, on the coast of Lancashire, between the estuaries of the Ribble and Wyre. It consists of lofty houses ranging along the shore for about 3 miles, with an excellent promenade and carriage-drive; has libraries and news-rooms, two handsome promenade-piers, a large aquarium, fine winter-gardens, etc. Pop. 58,376.

Black Prince, the son of Edward III. See *Edward*.

Black-quarter, a kind of apoplectic disease which attacks cattle, indicated by lameness of the fore-foot, one of the limbs swelling, and after death being suffused with blood, which also is found throughout the body.

Black River, or **Big Black River**, a stream which rises in the east of Missouri, flows through that state and Arkansas, and after a course of nearly 400 miles enters White River in Arkansas, being its largest tributary. There are several other streams, of

Blackrock

smaller size, in the United States, known by the same name.

Blackrock, a town of Ireland, on Dublin Bay, with a population of 8719. Sea-bathing and residential locality.

Black-rod, in England, the usher belonging to the order of the Garter, so called from the black rod which he carries. His full title is Gentleman-usher of the Black Rod, and his deputy is styled the Yeoman-usher. They are the official messengers of the House of Lords; and either the gentleman- or the yeoman-usher summons the Commons to the House of Lords when the royal assent is given to bills; and also executes orders for the commitment of parties guilty of breach of privilege and contempt.

Black Sea (ancient *Pontus Euxinus*), a sea situated between Europe and Asia, and bounded by the Russian, Turkish and Balkan countries, being connected with the Mediterranean by the Bosphorus, Sea of Marmora, and Dardanelles, and by the Strait of Kertsch with the Sea of Azov, which is, in fact, only a bay of the Black Sea. Area of the Black Sea and the Sea of Azov about 175,000 square miles, with a depth in the center of 1000 to 1070 fathoms and few shoals along its shores. The water is not so clear as that of the Mediterranean, and is less salt, since it receives many large rivers, the Danube, Dniester, Dnieper, Don, etc. Though not tidal, there are strong currents. The tempests on it are very violent, as the land which confines its agitated waters gives to them a kind of whirling motion, and in the winter it is scarcely navigable. During January and February the shores from Odessa to the Crimea are ice-bound. It contains few islands, and those of small extent. The most important ports are those of Odessa, Kherson, Eupatoria, Sebastopol, Batum, Trebizond, Samsun, Sinope, and Varna. The fisheries are of some value. After the capture of Constantinople the Turks excluded all but their own ships from the Black Sea until 1774, when, by the Treaty of Kainarji, they ceded to Russia the right also to trade in it. The same right was accorded to Austria in 1784, and by the Peace of Amiens to Britain and France in 1802. The preponderance thereafter gained by Russia was one of the causes of the Crimean war, in which she was compelled to cede her right to keep armed vessels in it, the sea being declared neutral by the Treaty of Paris, 1856. In 1871, however, when France could not attend, owing to

the Franco-German war, the sea was denaturalized by a conference of the European powers at London in response to the Russian protest.

Black-snake (*Bascanion constrictor*), a common snake in North America, reaching a length of 5 or 6 feet, and so agile and swift as to have been named the *Racer*. It has no poison fangs, and is therefore comparatively harmless. It feeds on small quadrupeds, birds, and the like, and is especially useful in killing rats.

Blackstone, a town (township) of Massachusetts, Worcester Co., with a manufacturing village of the same name, 20 miles S.E. of Worcester. It has manufactures of cotton goods, etc. Pop. 5648.

Blackstone, SIR WILLIAM, an eminent jurist, born in London in 1723; educated at the Charter House and Pembroke College, Oxford. In 1743 he was elected fellow of All-Souls College, Oxford, and in 1746 was called to the bar; but, having attended the Westminster law-courts for seven years without success, he retired to Oxford. Here he gave lectures on law, which suggested to Mr. Viner the idea of founding a professorship at Oxford for the study of the common law; and Blackstone was in 1758 chosen the first Vinerian professor. In 1759 he published a new edition of the *Great Charter and Charter of the Forest*; and during the same year resumed his attendance at Westminster Hall with abundant success. In 1761 he was elected M.P. for Hindon, made king's counsel and solicitor-general to the queen. He was also appointed principal of New Inn Hall, which office, with the Vinerian professorship, he soon resigned. In 1763 he published the first volume of his famous *Commentaries on the Laws of England*, the other three volumes being produced at intervals during the next four years. Its merits as an exposition made it for a long period the principal textbook of English law. He died in 1780.

Blacktail, the common name in the West for two North American deer, the large male deer and especially the smaller Columbian blacktail, *Cariacus columbianus*. The latter bears some resemblance to the species found in the East, *Cariacus virginianus*, except that in place of the white tail present in the latter its tail is black.

Black Vomit, a name of yellow fever.

Black Walnut (*Inglans nigra*), one of the most valuable timber trees of the United States. It occurs generally in the eastern part

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the country, though overcutting has made it rare in many localities. Its solid, dark-red timber has long been esteemed as a cabinet wood, largely used for furniture. The tree is large and bears a nut which is edible.

Black Warrior River, a stream in Alabama, which empties into the Tombigbee; length about 300 miles. It is navigable for steamboats for 150 miles from its mouth, and is sometimes known by its Indian name of Tuscaloosa.

Blackwater, the name of fifteen different rivers and streams in the United Kingdom, the most important in Munster, Ireland.

Blackwell, MRS. ANTOINETTE LOUISA FRAGIST, BROWN, an American suffragist, born 1825. She was ordained as minister to a Congregational church in 1853, subsequently becoming a Unitarian. A graduate of Oberlin, she was prominent in the suffragist movement. She wrote *The Sexes Throughout Nature, The Physical Basis of Immortality*, etc.

Blackwell, ELIZABETH, the first woman to obtain the degree of M. D. in the United States. She was born in England in 1821, and settled in America with her parents in 1831, where from 1838 to 1847 she was engaged in teaching. After numerous difficulties she was admitted into the College of Geneva, N. Y., and graduated M. D. in 1849. She afterwards studied in Paris, and commenced practice in New York in 1851. In 1854 she opened a hospital for women and children in New York. After 1869 she practised in London and Hastings. Died September 8, 1910. She wrote a number of works.

Blackwell's Island, in the East river, New York, a part of New York city. It has an area of 120 acres. On it is a penitentiary, lunatic asylum, workhouse, almshouse, and several hospitals.

Blackwood, or INDIAN ROSEWOOD, a leguminous tree of Hindustan (*Dalbergia latifolia*), the timber of which is much used in the manufacture of fine furniture. The Australian blackwood is the *Acacia melanoxylon*.

Blackwood, SIR HENRY, a British admiral, born in 1770; died in 1832. He entered the navy early in life, showed great daring and courage, and as captain of the *Brilliant* in 1798 fought two French frigates, each of nearly double his own force off the island of Teneriffe, and beat them both off. He commanded a frigate at Trafalgar. He was made captain of the fleet in 1814, soon after created a baronet and promoted rear-admiral, and in 1819 was made commander-in-chief of the East

India fleet. His last command was of the Chatham station.

Blackwood, WILLIAM, an Edinburgh publisher, born at Edinburgh 1776; died in 1834. He started as a bookseller in 1804, and soon became also a publisher. The first number of *Blackwood's Magazine* appeared 1st of April, 1817, and it has always been conducted in the Tory interest. He secured as contributors most of the leading writers belonging to the Tory party, among them Sir Walter Scott, Lockhart, Hogg, Professor Wilson, De Quincey, Dr. Moir (Delta), Thomas, Aird, Dr. Maginn, etc.

Bladder, URINARY, a musculo-membranous bag or pouch present in all mammalia, destined to receive and retain for a time the urine, which is secreted by the kidneys. It occupies the anterior and median portion of the pelvis, and in the male of the human subject is situated behind the pubis and above and in front of the rectum; in the female above and in front of the vagina and uterus. The urine secreted by the kidneys is conveyed into this reservoir by means of two tubes called the ureters, which open near the neck or lower part of the bladder in an oblique direction, by which means they prevent the reflux of the urine. When empty it forms a rounded, slightly conoid mass about the size of a small hen's egg. As it gradually fills with urine its walls become distended in all directions except in front, and it then rises above the pelvis proper into the abdomen. It is held in its place by two lateral ligaments, one on each side, and an anterior ligament. The contents are carried off by the urethra, which, as well as the neck of the bladder, is surrounded near the bladder (in the male only) by a structure called the prostate gland.

Bladder-fern. See *Cystopteris*.

Bladder-nut, a name of shrubs or small trees of the genus *Staphylea*, order *Sapindaceae*, natives of Europe, Asia, and North America, the fruits of which consist of an inflated bladdery capsule containing the seeds.

Bladder-seed, a weed of the umbelliferous family, noted for its inflated fruit.

Bladder-senna, a leguminous plant of South Europe, *Colutea arborescens*; suborder, *Leguminosae*. It is given this name from its dry, inflated pod and from the fact that its leaflets are said to have been used to adulterate senna.

Bladderwort (biad'der-wort), the common name of various species of slender aquatic plants,

genus *Utricularia*, order *Lentibulariaceae*, which are natives of Europe, the United States, etc., growing in ditches and pools. They are named from having little bladders or vesicles. These bladders have trap-door entrances which open only inwards. Small crustaceans, and other aquatic animals push their way into these bladders and are unable to escape; they are finally absorbed into the plant by star-shaped hairs lining the interior of the bladder.

Bladder-wrack (*Fucus vesiculosus*), a sea-weed so named from the floating vesicles in its fronds. It has been used in medicine.

Blaeu, BLAEUW or BLAUW (blä'u), a Dutch family celebrated as publishers of maps and books. William (1571-1638) established the business at Amsterdam, constructed celestial and terrestrial globes, and published *Novus Atlas* (6 vols.), an excellent work, and (*Theatrum Urbium et Munimentorum*). His son John (died 1673) published the *Atlas Magnus* (11 vols.), and various topographical plates and views of towns. The works of this family are still highly valued.

Blagovieshtchensk (blä-go-vyes'-chensk), a Russian town of Eastern Siberia, for a time capital of the province of the Amoor, on the Amoor and Zeya rivers, near the Chinese town of Aigoon. It is the center of the Zeya gold-mining district. Pop. 37,368.

Blaine (blän). JAMES GILLESPIE, American statesman, born in Washington Co., Pennsylvania, in 1830. He entered Washington College, Pa., at the age of thirteen, graduated in 1847, studied law, acted as a teacher, and then having gone to Augusta, Maine, was for several years a newspaper editor. He was sent to Congress by Maine as a Republican in 1862, and was repeatedly re-elected. Soon becoming prominent, he was several times Speaker of the House of Representatives. In 1876 he entered the Senate, and the same year he was second in his candidature for presidential nomination by the Republican national convention; he was also unsuccessful in his candidature in 1880; but in 1884 he was nominated as Republican candidate for President by a large majority, though the presidency went to Mr. Cleveland. In 1884 appeared the first volume of his *Twenty Years in Congress*, a work which has had a very favorable reception. He was Secretary of State from 1889 to 1892. He died January 27, 1893.

Blainville (blän-vél). HENRI MARIE DUCROTAY DE, French nat-

uralist, born 1777; died 1850. After attending a military school, and also studying art, his interest in Cuvier's lectures led him to the study of medicine and natural history. Cuvier chose him for his assistant in the College of France and the museum of natural history, and in 1812 secured for him the chair of anatomy and zoology in the Faculty of Sciences at Paris. In 1825 he was admitted to the Academy of Sciences; in 1829 he became professor in the Museum of Natural History, lecturing on the mollusca, zoophytes, and worms; and in 1832 he succeeded Cuvier in the chair of comparative anatomy ther. His chief works are *L'Organisation des Animaux ou Principes d'Anatomie Comparée* (1822); *Manuel de Malacologie et de Conchyliologie* (1825); *Cours de Physiologie Générale* (1829-32); *Manuel d'Actinologie* (1834); *Ostéographie*, a work on the vertebrate skeleton.

Blair (blär). FRANCIS PRESTON, general and lawyer, born at Lexington, Kentucky, in 1821; died 1875. He was elected a member of Congress from Missouri in 1856, entered the Civil war and became major-general in 1862, commanding a corps in Sherman's army 1864-65. In 1868 he was the Democratic candidate for Vice President, but was defeated; was U. S. Senator 1871-73. —MONTGOMERY BLAIR, his brother, born 1813, graduated at West Point 1835, and served in the Seminole war. Having left the army, he was appointed Postmaster General in President Lincoln's cabinet 1861-64. He subsequently left the Republican party and became strong Democrat. Died 1883.

Blair, HUGH, a Scottish divine and author, born at Edinburgh 1718; died in 1800. He was minister successively of Collessie in Fifeshire, Canongate Church, Edinburgh, Lady Yester's Church, and the High Church. In 1762 he was made professor of rhetoric and belles-lettres in the University of Edinburgh, being the first that ever occupied this chair. He was author of *Dissertation on the Poems of Ossian*, *Lectures on Rhetoric and Belles Lettres*, and *Sermons*, which were long greatly esteemed, and which, attracting the attention of George III, procured for the author a pension of £200 a year.

Blair, ROBERT, author of *The Graveyard*, born at Edinburgh, in 1699; died in 1746. He was ordained in 1731 minister of Athelstaneford, where he spent the remainder of his life. His *Graveyard* was first printed in 1743, and is now esteemed as one of the standard classics of English poetical literature. His third son, Rob-

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Blake, EDWARD (1833-1912), an Irish-Canadian statesman, born at Adelaide, Middlesex county, Ontario, son of William Hume Blake, of Cashel Grove, Galway, Ireland. He was educated at Upper Canada College and the University of Toronto. Called to the bar in 1856 he speedily gained a place in his profession, becoming Q. C. in 1864. In 1867 he became a member of the Ontario, as well as the Canadian, Parliament, and in the former took the position of leader of the Liberal opposition. On his party coming into power in 1871 he became premier of the Ontario legislature, but after one session resigned. In 1873 he became a member of the Canadian cabinet, and soon after president of the council and minister of justice under the Mackenzie administration, which, however, had to go out of office as the result of the election of 1878. On his return to Parliament in 1880 he was chosen leader of the Liberal party, holding the leadership till 1887, when he was succeeded by Sir Wilfrid Laurier. Becoming interested in Irish affairs he accepted an invitation from the Irish Nationalists and entered the British Parliament as member for South Longford in 1892. His reputation as a Canadian statesman was well known in the United Kingdom and great expectations were aroused over his entrance into Irish affairs, but he made little stir in the British Parliament and did not take a prominent part in the debates.

Blake, ELI WHITNEY, inventor, born at New Haven, Connecticut, in 1795; died in 1886. He was the nephew of Eli Whitney, the inventor of the cotton gin, and assisted him in his gin factory in Connecticut, becoming its proprietor on his death. Of his inventions, the most useful is the Blake stone breaker, now extensively used.

Blake, FRANCIS (1850-1913), an American inventor, born at Needham, Mass. He was connected with the United States Coast Survey from 1866 to 1870. He devoted himself to the study of experimental physics and in 1878 invented the famous telephone transmitter known under his name. The Blake transmitter is widely used throughout American and European countries. He patented several mechanical devices.

Blake, LILLIE DEVEREUX, an American woman suffragist, born in Raleigh, S. C., 1833. One of her first attempts to gain equal rights for women was her demand for admittance to Yale University, which was denied her. In 1870 she espoused the cause of woman suffrage. Her lectures in reply to Rev.

Dr. Morgan Dix were published in book form with the title *Woman's Place Today*, and became a handbook on woman suffrage. She died Dec. 30, 1913.

Blake, ROBERT, a celebrated English admiral, was born at Bridgewater in 1599; died at the entrance of Plymouth Sound in 1657. Educated at Oxford, he was sent to Parliament for Bridgewater in 1640. This being soon dissolved he lost his election for the next, and sought to advance the parliamentary cause in a military capacity in the war which then broke out. He soon distinguished himself, and in 1649 was sent to command the fleet with Colonels Deane and Popham. He attempted to block up Prince Rupert in Kinsale, but the prince, contriving to get his fleet out, escaped to Lisbon, where Blake followed him. Being refused permission to attack him in the Tagus by the King of Portugal, he took several rich prizes from the Portuguese, and followed Rupert to Malaga, where, without asking permission of Spain, he attacked him and nearly destroyed the whole of his fleet. His greatest achievements were, however, in the Dutch war which broke out in 1652. On the 19th of May he was attacked in the Downs by Van Tromp with a fleet of forty-five sail, the force of Blake amounting only to twenty-three, but Van Tromp was obliged to retreat. On May 29 he was again attacked by Van Tromp, whose fleet was now increased to eighty sail. Blake had a very inferior force, and after every possible exertion was obliged to retreat into the Thames. In February following he put to sea with sixty sail, and soon after met the Dutch admiral, who had seventy sail and 300 merchantmen under convoy. During three days a running fight up the Channel was maintained with obstinate valor on both sides, the result of which was the loss of eleven men-of-war and thirty merchant ships by the Dutch, while that of the English was only one man-of-war. In this action Blake was severely wounded. On June 3 he again engaged Van Tromp and forced the Dutch to retire with considerable loss into their own harbors. In November, 1654, he was sent with a strong fleet to enforce a due respect to the British flag in the Mediterranean. He sailed first to Algiers, which submitted, and then demolished the castles of Goletta and Porto Ferino, at Tunis, because the dey refused to deliver up the British captives. A squadron of his ships also blocked up Cadiz, and intercepted a Spanish Plate fleet. In April, 1657, he sailed with twenty-four ships to Santa Cruz, in Teneriffe; and, notwithstanding the strength of the place, burned the ships of another Spanish Plate fleet which had

Blake

taken shelter there, and by a fortunate change of wind came out without loss. Embarking on another cruise, he died before returning to English soil, and was buried in Westminster Abbey, whence his body was removed at the Restoration and buried in St. Margaret's Churchyard.

Blake, WILLIAM, mystic artist and poet, author of many exquisite lyrics, and of designs mainly allegorical or symbolical, was the son of a London hosier, and was born in 1757. He was apprenticed to an engraver at the age of fourteen. After completing his apprenticeship he was for a short time a student in the Royal Academy, and for years supported himself mainly by engraving for the booksellers. In 1782 he married Catherine Boucher, who proved an invaluable help to him in his work. Next year he published *Poetical Sketches*, in the ordinary way and without illustrations. Failing to find a publisher for his next work, *Songs of Innocence*, he invented a process by which he was both printer and illustrator of his own poems. He engraved upon copper both the text of his poems and the surrounding decorative design, and to the pages printed from the plates an appropriate coloring was afterwards added by hand. In this way the whole of his future work was produced. Some of his other best-known works are: *Gates of Paradise*, *Book of Thel*, *Marriage of Heaven and Hell*, *Songs of Experience*, *Book of Urizen*, *Song of Los*, *Book of Ahania*, etc. He also illustrated Young's *Night Thoughts*, Blair's *Grave*, and *The Book of Job*. The distinguishing feature of his genius was the faculty of seeing the creations of his imagination with such vividness that they were as real to him as objects of sense. He died in 1827. His complete poetical works were collected in 1874, and a volume of etchings from his works, with descriptive text, was published in 1878.

Blakelock, RALPH ALBERT, an American painter, born in New York in 1847. His works, which include many landscapes and subjects from Indian life, are markedly original.

Blanc (blān), AUGUSTE ALEXANDRE PHILIPPE CHARLES, younger brother of Louis Blanc, born 1813; died 1882. An eminent art-critic, he was elected a member of the French Academy in 1878, and filled the chair of æsthetics and art-history in the Collège de France. He wrote *Grammaire des Arts du Dessin*, *L'Art dans la Parure*, *Observations sur les Arts Égyptien et Arabe*, etc.

Blanc (blān), JEAN JOSEPH LOUIS, French historian, publicist, and

Blanche of Castile

politician, born at Madrid 1811; died Cannes 1882. He was educated at Rhodé and Paris, and early devoted himself to the career of journalism. In 1830 he founded the *Revue du Progrès*, in which first appeared his *De l'Organisation du Travail*. In 1841-44 appeared his *Histoire de Dix Ans: 1830-1840*. On the outbreak of the revolution of 1848 Blanc was elected a member of the provisional government, and appointed president for the discussion of the labor question. After the closing of the *Atelier Nationaux*, a scheme which he strenuously opposed, and the June insurrection of 1848, he was prosecuted for conspiracy, but escaped to England. During his residence there he wrote the bulk of his *Histoire de la Révolution Française*. His other works of note are: *Lettres de l'Angleterre* (1865-67), *Histoire de la Révolution de 1848* (1870), *Question d'Aujourd'hui et de Demain* (1873-74). On the downfall of the Second Empire Blanc returned to Paris, and became member of the National Assembly.

Blanc, MONT. See *Mont Blanc*.

Blanchard (blān-shär), FRANÇOIS, French aeronaut, born 1753; died 1809. In 1785 he crossed the Channel in a balloon, for which feat he received a pension from the French king. He made many remarkable ascents in various parts of the world. His wife, born 1778, was his companion in many of his voyages, and was killed by her balloon taking fire, 1819.

Blanchard (blān'shär), LAMAN, an English miscellaneous writer, born in 1804; died in 1845. In 1828 he published a volume of poetry, entitled *Lyrical Offerings*. In 1831 he became editor of the *Monthly Magazine*, and was afterwards connected with several magazines and newspapers. The death of his wife affected him so deeply that in a moment of temporary insanity he committed suicide. His tales and essays, entitled *Sketches from Life*, were published with a memoir by Lord Lytton in 1846. His poetical works in 1876.

Blanche of Castile, daughter of Alphonso IX, queen of Louis VIII, King of France, and mother of St. Louis, born in 1187; died in 1252 or 1253. On the death of Louis VIII she procured the coronation of her son, and during his minority held the reins of government in his name with distinguished success. In 1244, when St. Louis left for the Holy Land, she again became regent, and gave new proofs of her abilities and firmness as a ruler.

Blanching. See *Etiolation*.

Blanc-mange (blé-māph'), a name used in cookery for different preparations of the consistency of a jelly, variously composed of dissolved isinglass, arrow-root, maize-flour, etc., with milk and flavoring substances.

Bland, RICHARD P., statesman, born near Hartford, Kentucky, in 1835. He was admitted to the bar of Utah in 1860; practised law in California and Nevada; went to Missouri in 1865 and was member of Congress from that state from 1872 until his death in 1899, with the exception of one term. He was author of the Bland silver bill, passed in 1878, and an advocate of tariff reform.

Blane (blān), SIR GILBERT, a Scottish physician, born in Ayrshire in 1740; died in 1834. He was educated at Edinburgh University, but took the degree of M. D. at Glasgow. He became private physician to Admiral Rodney, and then physician to the fleet in the W. Indies, in which position he introduced the use of lime-juice and other means of preventing scurvy into the navy. In 1783-95 he was physician in St. Thomas's Hospital. He was physician-in-ordinary to George IV both before and after he became king. His chief publication is *Elements of Medical Logic*.

Blanckenberghe (blān'ken-berg), a much frequented seaside resort on the coast of Belgium, is 9 miles N. W. of Bruges. Pop. 5925.

Blankenburg, a town of Germany, duchy of Brunswick, on the northern slope of the Harz Mountains, a favorite resort of tourists. On the summit of a height is the ducal palace. Pop. 10,173.

Blankenese (blān'ke-nā-ze), a Prussian town on the right bank of the Elbe, 5 miles W. of Altona; a pleasure-resort of the Altonese and Hamburgers. Pop. 4736.

Blank Verse, verse without rhyme, first introduced into English poetry (from the Italian) by the Earl of Surrey, who was beheaded in 1547. The most common form of English blank verse is the decasyllabic, such as that of Milton's *Paradise Lost*; or of the dramas of Shakespeare. From Shakespeare's time it has been the kind of verse almost universally used by dramatic writers, who often employ an additional syllable, making the lines not strictly decasyllabic. The first use of the term blank verse is said to be in Hamlet, ii. 2: 'The lady shall say her mind freely, or the blank verse shall halt for it.' The term is not applied to the Anglo-Saxon

and early English alliterative unrhymed verse.

Blanqui (blān-kē), JEROME ADOLPHE, a French economist, born at Nice in 1798; died at Paris in 1854. While studying at Paris he made acquaintance with Jean Baptiste Say, and was induced to devote himself to the study of economics. He succeeded Say in the Conservatoire des Arts et Métiers as professor of industrial economy. Blanqui, who favored a free-trade policy, published, among other works, *Précis Élémentaire d'Economie Politique* and *Histoire de l'Economie Politique en Europe*.—LOUIS AUGUSTE, his brother, born in 1805; died 1881; was early engaged as a socialistic revolutionist and conspirator, and spent much of his life in prison.

Blantyre (blān-tīr'), a populous mining parish in Lanarkshire, Scotland, containing several villages, at one of which, 8 miles S. E. of Glasgow, Dr. Livingstone was born. This parish has given its name to an African mission station founded in 1876 by the Established Church of Scotland, on the heights which rise between the Upper Shiré river and Lake Shirwa, Nyassaland, now the center of settlement and trade.

Blapsidæ (blāp'si-dē), a family of nocturnal black beetles, whose wings are generally wanting and their elytra attached to each other. They frequent gloomy damp places, and when seized discharge, in self-defense, a liquid of a peculiar penetrating odor.

Blarney (blār'nē), a village of Ireland, 4 miles N. W. of the city of Cork, with Blarney Castle in its vicinity. A stone called the *Blarney Stone*, near the top of the castle, is fabled to confer on those who kiss it the peculiar kind of persuasive eloquence alleged to be characteristic of the natives of Ireland.

Blashfield, EDWIN HOWLAND, an American painter, born in 1848; famous as a mural decorator. Examples of his work may be seen in the Library of Congress and in the Minnesota and Iowa State capitols.

Blasius (blā'si-us), St., Bishop of Sebaste, in Asia Minor, is said to have suffered martyrdom about 316. He is said to have been tortured with a wool-comb, hence he is claimed as the patron-saint of the wool-combers.

Blasphemy (blas'fe-mī), signifies the denying of the existence of God, assigning to him false attributes, or denying his true attributes; contumelious reproaches of Jesus Christ; profane scoffing at the Holy Scriptures, or exposing them to ridicule and contempt. In Catholic countries it also included the

speaking contemptuously or disrespectfully of the Holy Virgin or the saints. By the common law of England blasphemies of God, as denying his being and providence, all contumelious reproaches of Jesus Christ, etc., are punishable by fine and imprisonment or corporal punishment. In a case decided in 1883 it was held that a person may attack the fundamentals of religion without being guilty of a blasphemous libel 'if the decencies of controversy are observed.' In the United States, besides the common law, there are many statutes defining blasphemy; but they all hold it to consist in words regarding the Deity only. It is a misdemeanor at common law.

Blast, Hor. See *Blast-furnace*.

Blast-furnace, the name given to the common smelting furnace used for obtaining iron from its ores with the aid of a powerful blast of air. This air-blast, which is propelled by a powerful blowing-engine and is now invariably heated to a high temperature (1000° to 1400° F.), is injected by pipes



Section of Blast-furnace.

The exterior consists of massive masonry of stone or firebrick, the body part being lined with two shells of firebricks separated by a thin space to allow for expansion, this space being generally filled with sand, ground fire-clay, or the like, to hinder the radiation of heat to the outside. When the body rises in the form of a perpendicular cylinder it is called the barrel. The cone or barrel is sometimes clasped round on the outside by numerous strong iron hoops, or is cased with iron plates fastened to the masonry by iron bolts. The boshes, c, are lined with firebrick or firestone, and the hearth,

d, is built with large blocks of refractory stone. The charging of the furnace goes on all day and night, one charge consisting of a barrow-load of coal and barrow-load of ore and usually lime, the last mineral acting as a flux. The charges are constantly passing downward and undergoing a change as they come nearer the hotter parts of the furnace. Towards the lower part the earthy matter of the ore unites with the limestone and forms a slag, which finally escapes through an opening below the tuyeres, and the molten metal drops down and fills the lower part at d, to be drawn off at stated periods. This is done usually twice in the twenty-four hours by means of a round hole called a tap. The furnace is constantly kept filled to within about two feet of the top. The ore put in at the top takes about thirty-six hours before it comes out as iron. Hematite yields on an average about 55 per cent. of metal and blackband, about 40 to 50. In newer forms of furnaces the top is closed and the gases formerly burned at the top are conveyed by pipes, e, to be utilized as fuel in heating the blast and in raising steam for the blowing-engine. The principle adopted is to close the top by a bell-and-cone arrangement, e, which is opened and shut at pleasure by hydraulic or other machinery. The height of furnaces varies from 50 to 80, and even in some cases to upwards of 100 feet, and the greatest width is about one-third the height.

Blasting, the operation of breaking up masses of stone or rock *in situ* by means of gunpowder or other explosive. In ordinary operations holes are bored into the rock one or more inches in diameter by means of a steam pointed drill, which is struck with hammers or allowed to fall from a height. After the hole is bored to the required depth it is cleaned out, the explosive introduced, the hole is 'tamped' or filled up with broken stone, clay, or sand, and the charge exploded by means of a fuse or by electricity. In larger operations mines or shafts of considerable diameter take the place of the holes above described. Shafts are sunk from the top of the rock to various depths, sometimes upwards of 60 feet. This shaft joins a heading gallery, driven in from the face, if possible along a natural joint; and from this point other galleries are driven some at intervals, returning towards the face of the rock and terminating in chambers for the charges. Enormous charges of gunpowder are frequently made use of, upwards of twenty tons of gunpowder having been

Blasting

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Blastoderm

fred in a single blast. One of the great-
est blasting operations ever attempted
was the removal of the reefs in the East
River, near New York, known as Hell-
gate. An entrance-shaft was sunk on
the Long Island shore, from which the
reef projected. From this shaft nearly
twenty tunnels were bored in all direc-
tions, extending from 200 to 240 feet,
and connected by lateral galleries. Up-
wards of a quarter million lbs. of dyna-
mite, rend-rock and powder were used,
and many thousands of tons of rock were
dislodged. Numerous important improve-
ments have been made in blasting by the
substitution of rock-boring machines for
hand labor. Of such machines, in which
the 'jumper' or drill is repeatedly driven
against the rock by compressed air or
steam, being also made to rotate slightly
at each blow, there are many varieties.

Blastoderm (blas'todêrm), in biol-
ogy, the germinal skin
or membrane forming the superficial layer
of the impregnated ovum, and from which
the rudiment of the new being is formed.

Blastogenesis (blas'to-gen'e-sis), in
biology, reproduction
by gemmation or budding.

Blastoidea (blas'toi-de-a), an order
of fossil Echinodermata,
closely allied to the Crinoidea. The body
was enclosed in a kind of box, formed by
jointed calcareous plates, and was, in
most cases, permanently fixed to the sea-
bottom by a stalk or column.

Blastomere (blas'tô-mêr), in biology,
the term applied to each
segment into which the ovum divides
after impregnation. The segments may
remain united as a single cell-aggregate,
or some or all of them may become sepa-
rate organisms.

Blattidae (blat'l-dê), a family of in-
sects of the order Orthop-
tera. They are extremely voracious,
some species apparently eating almost
everything that comes in their way. The
type of the family is the well-known cock-
roach (*Blatta orientalis*).

Blavatsky (bla-vat'ski), HELENA
PETROVNA, theosophist,
born at Yekaterinoslav, Russia, in 1831,
became a citizen of the United States.
She was one of the chief founders of the
Theosophical Society and its leader until
her death in 1891. She wrote *Isis Un-
veiled*, *The Secret Doctrine*, *Key to Theos-
ophy*, etc.

Blaye (bla), a fortified port of France
on the Gironde, covering, with
other forts, the approach to Bordeaux.
Pop. 3423.

Blazonry (bla'son-ri), in heraldry,
the art of describing coats-

Bleaching-powder

of-arms in proper technical terms and
method.

Bleaching (blêch'ing), the act or
art of freeing textile
fibers and fabrics and various other sub-
stances (such as materials for paper,
ivory, wax, oils) from their natural color,
and rendering them perfectly white, or
nearly so. The ancient method of bleach-
ing, by exposing the fabrics, etc., to the
action of the sun's rays, and frequently
wetting them, has been nearly superseded,
at least where the business is conducted
on a large scale, more complicated pro-
cesses in connection with powerful chemi-
cal preparations being now employed.
Among these the chief are chlorine and
sulphurous acid, the latter being em-
ployed more especially in the case of ani-
mal fibers (silk and wool), while cotton,
flax, and other vegetable fibers are op-
erated upon with chlorine, the bleaching in
both cases being preceded by certain
cleansing processes. The use of chlorine
as a bleaching agent was first pro-
posed by Berthollet in 1786, and shortly
afterwards introduced into Great Brit-
ain, where it was first used simply
dissolved in water, afterwards dissolved
in alkali, and then in the form of bleach-
ing-powder, commonly called chloride of
lime, the manufacture of which was
patented by Mr. Tennant of St. Rollox,
Glasgow, in 1799. In modern calico
bleaching the preliminary process is *singe-
ing* by passing the fabric over red-hot
plates or through a gas-flame to remove
the downy pile and short threads from the
surface of the cloth. The goods next pass
to the *liming* process, when they are uni-
formly and thoroughly impregnated with
a supersaturated solution of lime. The
next process is the *bowking* or boiling for
several hours, after which they are
washed. They are then *soured* by being
passed through a solution of hydrochloric
acid for the purpose of dissolving any
traces of free lime which may have been
left in the washing, and to decompose the
calcareous soap formed by the bowking
process. After boiling in kiers with a
solution of soda-ash and rosin and an-
other washing, the cloth is ready for the
processes of *chemicking* or liquoring with
bleaching-powder, and *white-souring* with
a very dilute sulphuric acid. Another
thorough washing concludes the opera-
tions of bleaching proper, after which
the cloth goes through various finishing
processes. Modifications of the same
processes are adopted in bleaching linen,
wool, silk, etc.

Bleaching-powder, chloride of lime
made by expos-
ing slaked lime to the action of chlorine.

It is regarded as a double salt of the chloride of calcium and hypochlorite of calcium. It is much used as a disinfectant, besides its use in bleaching.

Bleak (blēk), a small river fish, 6 or 7 inches long, the *Lenciscus alburnus*, of the Carp family. It somewhat resembles the dace, and is found in many European rivers. Its back is greenish, otherwise it is of a silvery color, and its silvery scales are used in the manufacture of artificial pearls. It is good eating.

Bleek (blēk), FRIEDRICH, a German Biblical scholar and critic, born in 1793; died in 1859. He was appointed professor of theology at Bonn 1829. He was the author of expository books, Introductions to the Old and New Testaments (1860-62), etc.

Bleek, WILHELM HEINRICH IMMANUEL, son of the above, an able linguist, especially in the South African languages, born at Berlin in 1827; died at Cape Town in 1875. In 1855 he went to South Africa and devoted himself to the study of the language, manners, and customs of the natives. He was principal author of the *Handbook of African, Australian, and Polynesian Philology*, 1858-93, his other chief productions being *Vocabulary of the Mozambique Languages*, 1856; *Comparative Grammar of South African Languages*, 1869; *Hottentot Fables and Tales*, 1864; and *The Origin of Language*, 1868.

Blende (blend), an ore of zinc, called also *Mock-lead*, *False Galena*, and *Black-jack*. Its color is mostly yellow, brown, and black. There are several varieties, but in general this ore contains more than half its weight of zinc, about one-fourth sulphur, and usually a small portion of iron. It is a native sulphide of zinc.

Blenheim (blen'im; Ger. blen'him), a village in Bavaria on the Danube. Near it was fought, August 13, 1704, during the war of the Spanish succession, the famous battle of Blenheim (or *Höchstädt*, from another village in the vicinity), in which Marlborough and Prince Eugene, commanding the allied forces of England and Germany (52,000 men), gained a brilliant victory over the French and Bavarians (56,000). The victors lost some 12,000 in killed and wounded; the vanquished 40,000, including prisoners.—The palatial residence of the Dukes of Marlborough at Woodstock, Oxfordshire, was named from this victory.

Blenheim Dog, a variety of spaniel, bearing a close resemblance to the King Charles breed, but somewhat smaller, so named from having been originally bred by one of the Dukes of Marlborough.

Blenker, LOUIS, born at Worms, Hesse-Darmstadt, in 1803. He died in Virginia in 1863. He served in the Bavarian army in 1833-37. In 1840, on account of his revolutionary activities, his native city, he was forced to go to Switzerland, emigrating in the year to the United States. He settled in New York, and at the outbreak of the Civil war he organized the 8th regiment of New York Volunteers. For distinguished services he was promoted to command of a division in the Army of the Potomac. He died from injuries on the field.

Blenkinsop, JOHN, British inventor, born 1783; died 1835. He was the inventor of the first commercially successful locomotive steam-engine. It was a cogwheeled engine, employed at Hunslet Moor, near Leeds, to draw a load of 30 tons. To this demonstration George Stephenson, who saw Blenkinsop's experiment, is perhaps indebted for ideas in building the *Rocket*.

Blennerhasset, HARMAN, an Irish-born American lawyer, born in County Kerry, Ireland, 1765. In 1796 he married his niece, Margaret, a Quaker. Being ostracized by his family for this act by their families, the couple emigrated to America, where Blennerhasset purchased an island in the Ohio River near Parkersburg, W. Va. Here in 1805 he was visited by Aaron Burr, in whose conspiracy to seize Texas he became implicated, supplying funds for its support and offering the use of his island as a depot of supplies and a training ground. On the collapse of the conspiracy the mission and island were plundered by Virginia troops. Blennerhasset fled, was arrested and remained a prisoner till after the release of Burr. The island residence was abandoned and Blennerhasset went to Mississippi, then to Montreal, and finally returned to Ireland. He died in the island of Guernsey, February 1831. His wife, Margaret, published *The Deserted Isle*, *The Widow of the River*, and *Other Poems*. She died in New York in 1842.

Blenny (blen'i), a genus of acanthopterygious fishes (*Blennius*). They are distinguished by a short rounded head and a long, compressed smooth body. Owing to the smallness of their gill openings they can exist for some time without water.

Blesbok (bles'bok; *Alceläphus capensis*), an antelope of South Africa with a white marked face; formerly found in great numbers in the Orange Free State and much hunted.

Blessing, or BENEDICTION, a prayer, or solemn wish imploring happiness upon another; a certain blessing.

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action which, combined with prayer, seeks for God's grace for persons, and, in a lower degree, a blessing upon things, with a view to their efficiency or safety. The lifting up of the hands is an inseparable adjunct of the act of blessing. In the Roman Catholic Church formerly the thumb and the two first fingers of the right hand were extended, the two remaining fingers turned down; now all the fingers are extended. In the Greek Church the thumb and the third finger of the same hand are conjoined, the other fingers being stretched out. Some see in this position a representation of the sacred monogram in Greek letters of our Lord's name.

Blessington (bles'ing-ton), MARGA- RITE, COUNTESS OF, was born near Clonmel, Ireland, in 1789; died at Paris in 1849. She was twice married, the second time to Charles John Gardiner, earl of Blessington. After his death in 1829, Lady Blessington took up her abode in Gore House, Kensington. Her residence became the fashionable resort for all the celebrities of the time; and that notwithstanding a doubtful connection which she formed with Count D'Orsay, with whom she lived till her death. She wrote *Conversations with Lord Byron*; numerous novels, including *The Belle of a Season*, *The Two Friends*, *Strathern*, and the *Victims of Society*; and acted as editor, for several years, of the *Book of Beauty*, and the *Keeper'sake*.

Bletia (blé'ti-ä), a widely distributed genus of plants of the family *Orchideæ*. In the American tropics about 20 species exist, and one species is found in China and Japan.

Blicher (blé'her), STEEN STENSEN, Danish lyrical poet and novelist, born 1782; died 1848. His collected poems, which are national and spirited, were published 1835-36; and his novels, which give admirable pictures of country life in Jutland, in 1840-47. He also translated *Ossian*.

Blidah (blé'dä), a fortified town of Algeria, 30 miles inland from Algiers, well built, with modern houses and public edifices, the center of a flourishing district, and having a good trade. Pop. 16,886.

Bligh (bli), WILLIAM, the commander of the ship *Bounty* when the crew mutinied in the South Seas and carried her off. He was born in Cornwall in 1753; died at London in 1817. The *Bounty* had been fitted out for the purpose of procuring plants of the bread-fruit tree, and introducing these into the West Indies. Bligh left Tahiti in 1789, and was proceeding on his voyage for Jamaica when he was seized, and, with eighteen men supposed to be quite loyal to him, forced into a launch, sparingly

provisioned, and cast adrift not far from the island of Tofoa (Tonga Islands), in lat. 19° S. and lon. 184° E. By admirable skill and perseverance, though not without enduring fearful hardships, they managed to reach the island of Timor in forty-one days, after running nearly 4000 miles. Bligh with twelve of his companions, arrived in England in 1790, while the mutineers settled on Pitcairn Island, where their descendants still exist. Bligh became governor of New South Wales in 1806, but his harsh and despotic conduct caused him to be deposed and sent back to England. He afterwards rose to the rank of admiral.

Blight (blit), a generic name commonly applied to denote the effects of disease or any other circumstance which causes plants to wither or decay. It has been vaguely applied to almost every disease of plants, whether caused by the condition of the atmosphere or of the soil, the attacks of insects, parasitic fungi, etc. See *Smut*, *Bunt*, *Ergot*.

Blighty (bli'ti), soldiers' slang for England, used in Great War.

Blim'bing, the Indian name of the fruit of *Averrhoa Bilimba*, a small tree, family *Oxalidaceæ*, called also *Cucumber-tree*, the fruit being acid and resembling a small cucumber. The carambola (which see) belongs to the same genus.

Blind (blind), a screen of some sort to prevent too strong a light from shining in at a window or to keep people from seeing in. *Venetian blinds* are made of slats of wood, so connected as to overlap each other when closed, and to show a series of open spaces for the admission of light and air when in the other position.

Blind (blint), KAREL, German political agitator and writer on history, mythology, and Germanic literature, born at Mannheim 1826. He was educated at Heidelberg and Bonn, and from his student days till he settled in England in 1852 he was continually engaged in agitating or in heading risings in the cause of German freedom and union. He was frequently imprisoned. The democratic propaganda was supported by his pen; and he wrote *Fire-burial among our German Forefathers*; *Teutonic Cremation*; *Ygdrasil*, or *The Teutonic Tree of Existence*, etc. Died 1907.

Blind, The absence or deficiency of the sense of sight. Blindness may vary in degree from the slightest impairment of vision to total loss of sight; it may also be temporary or permanent. It is caused by defect, disease, or injury to the eye, to the optic

nerve or tract, or to that part of the brain connected with it. Old age is sometimes accompanied with blindness, occasioned by the drying up of the humors of the eye, or by the opacity of the cornea, the crystalline lens, etc. There are several causes which produce blindness from birth. Sometimes the eyelids adhere to each other or to the eyeball itself, or a contagious escharotic inflammation occurs, or a membrane covers the eyes; sometimes the pupil of the eye is closed, or adheres to the cornea, or is not situated in the right place, so that the rays of light do not fall in the middle of the eye; besides other defects. (See *Color Blindness*, *Hemeralopia*, *Nyctalopia*.) The blind are often distinguished for a remarkable mental activity, and a wonderful development of the intellectual powers. Their touch and hearing, particularly, become very acute.

As early as 1260 an asylum for the blind (*L'Hospice des Quinze-Vingts*) was founded in Paris by St. Louis for the relief of the Crusaders who lost their sight in Egypt and Syria; but the first institution for the instruction of the blind was the idea of Valentin Haüy, brother of the celebrated mineralogist. In 1784 he opened an institution in which they were instructed not only in appropriate mechanical employments, as spinning, knitting, making ropes or fringes, and working in pasteboard, but also in music, in reading, writing, ciphering, geography, and the sciences. For instruction in reading he prepared raised letters of metal; for writing he used particular writing-cases, in which a frame, with wires to separate the lines, could be fastened upon the paper; for ciphering there were movable figures of metal, and ciphering-boards in which the figures could be fixed; for teaching geography maps were prepared upon which mountains, rivers, cities, and the boundaries of countries were indicated to the sense of touch in various ways, etc. Similar institutions were soon afterwards founded in Amsterdam, Berlin, Brussels, Copenhagen, Dresden, Edinburgh, Liverpool, London, Vienna, and in many towns of the United States. There are now comparatively few large cities that do not possess a school or institution of some kind for the blind. The occupations in which the blind are found capable of engaging are such as the making of baskets and other kinds of wicker-work, brushmaking, rope and twine making, the making of mats and matting, knitting, netting, fancy work of various kinds, cutting firewood, the sewing of sacks and bags, the carving of articles in wood, etc. Piano-tuning is

also successfully carried on by some, the cleaning of clocks and watches even been occasionally practised by them.

Various systems have been devised for the purpose of teaching the blind to read, some of which consist in the use of the ordinary Roman alphabet, with more or less modification, and some of which employ types quite arbitrary in form. In all systems the characters rise above the surface of the paper so as to be felt by the fingers. The type adopted by Braille was the script or italic form of the man letter. This was introduced into England by Sir C. Lowther, who printed the Gospel of St. Matthew in 1832 of this type obtained from Paris. Before Gall of Edinburgh made use of an abridged alphabet based on the ordinary Roman small letters, in which all curves were replaced by angular lines, and in 1834 he published the Gospel of St. Matthew in this character. Subsequently he introduced various improvements, and particularly the letters were produced on serrated surfaces, thus giving greater distinctness. Alston of Glasgow, Howland of Boston, and others also used the Roman form; but the former (who was the first to print the whole Bible, in 1815) adopted the Roman capitals, while the latter adopted the small letters, printed in this type the Bible and many other books. Of alphabets deviating entirely or nearly so from the Roman letter, the most consists of a stenographic shorthand invented by Lucas of Bristol; another is a phonetic shorthand devised by Francis Moon of London. In Dr. Moon's alphabet some of the characters are Roman, others are based on or suggested by the Roman characters. The Braille system is one in which the letters are formed by a combination of dots. Dr. Moon's system, from its simplicity and the size of the characters has been largely used in books for the blind, but the Braille System is now chiefly used. There are also systems by which they can write. See *Braille*.

Blind-fish, the name of several species of fish, family *Amblyopsidae*, inhabiting the waters of American caves. They are all small, the largest exceeding five inches. In the type species (*Amblyopsis spelaeus*) of Mammoth Cave of Kentucky, the eyes are reduced to a useless rudiment hidden under the skin, the body is translucent and colorless, and the head and body covered with numerous rows of sensitive papillae, which form very delicate organs of touch.

Blind Harry. See *Harry the Blind* and *Harry the Scotch*.

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Bliss, TASKER HOWARD, general, U. S. A., born at Lewisburg, Pa., in 1853, was educated at Lewisburg (now Bucknell) University, graduated from U. S. Military Academy in 1875. He served through the Porto Rican campaign of 1898 and was appointed special envoy to Cuba to negotiate the treaty of reciprocity between that country and the United States in 1902. He was commander of the Departments of Luzon and Mindanao, Philippine Islands, from 1905 to 1906. In the latter year he became a member of the Army General Staff and president of the Army War College. He was appointed Assistant Chief of Staff in 1915 and succeeded Major General Scott as Chief of Staff in September, 1917. He was military representative of the War Department at the American section of the Peace Conference at Versailles, and one of the signers of the treaty of Versailles, signed June 28, 1919.

Blister (blist-er), a general application of heat, when applied to the skin, raises the fluid in the form of a vesicle, filled with serous fluid, and so produces a counter-irritation. The Spanish fly-blister is made with most certainty and expedition, and is commonly used for this purpose, as are also mustard, hartshorn, etc. Also called vesicatory.

Blister-beetle, **BLISTER-FLY**, the Spanish fly used in making cantharidal blisters, etc.

Blister-steel, iron bars which, when converted into steel, have their surface covered with blisters, probably from the expansion of minute bubbles of air. Steel is used in the blister state for welding to iron for certain pieces of mechanism, but is not employed for making edge-tools. It requires for this purpose to be converted into cast or shear steel. See *Steel*.

Bliz'ard, a storm of very cold wind with fine, powdery snow, occurring in some parts of the United States and often causing loss of life through suffocation and cold. Their ordinary locality is in the region between the Rocky Mountains and the Mississippi, where they frequently occur, though disastrous ones are rare. In that of January, 1888, the severest on record, 35 persons lost their lives, while the cold was so intense that the Colorado River of Texas was frozen a foot deep, an unprecedented event.

Bloch (blok), **MARCUS ELIEZER**, a naturalist of Jewish descent, born at Anspach in 1723; died 1799. His principal work is the *Naturgeschichte der Fische* (Natural History of Fishes), 1785-99, with 432 colored plates.

Block, a mechanical contrivance consisting of one or more grooved pulleys mounted in a casing or shell, which is furnished with a hook, eye, or strap by which it may be attached to an object, the function of the apparatus being to transmit power or change the direction of motion by means of a rope or chain passing round the movable pulleys. Blocks are single, double, treble, or four-fold, according as the number of sheaves or pulleys is one, two, three, or four. A *running block* is attached to the object to be raised or moved; a *standing block* is fixed to some permanent support. Blocks also receive different denominations from their shape, purpose, and mode of application. They are sometimes made of iron as well as of wood. Blocks to which the name of *dead-eyes* has been given, are not pulleys, being unprovided with sheaves. See also *Pulley*.

Blockade (blok-ad'), is the rendering of intercourse with the sea-ports of an enemy unlawful on the part of neutrals, and it consists essentially in the presence of a sufficient naval force to make such intercourse difficult. It must be declared or made public, so that neutrals may have notice of it. If a blockade is instituted by a sufficient authority, and maintained by a sufficient force, a neutral is so far affected by it that an attempt to trade with the place invested subjects vessel and cargo to confiscation by the blockading power. The term is also used to describe the state of matters when hostile forces sit down around a place and keep possession of all the means of access to it, so as to entirely cut off its communication with the outside world, and so compel surrender from want of supplies.

Block-books, *block-printing*. Before the invention of printing, books were printed from wooden blocks each the size of a page and having the matter to be reproduced, whether text or picture, cut in relief on the surface. In China, where the art of printing was first discovered, this system continues in use, though movable types have long been known there. With their cheap labor block-books can be cheaply produced.

Blockhouse, a fortified edifice of one or more stories, constructed chiefly of blocks of hewn timber. Blockhouses are supplied with loopholes for musketry (a, c) and sometimes with embrasures for cannon, and when of more than one story the upper ones are made to overhang those below, and are furnished with machicolations or loopholes in the overhung floor, so that

Block Island

a perpendicular fire can be directed against the enemy in close attack. Block-



Blockhouse.

houses are often of great advantage, and in wooded localities readily constructed.

Block Island, an island in the Atlantic, about 10 miles

out from the mainland of Rhode Island, to which it belongs, and 8 miles long. It is a popular summer resort, constituting the township of New Shoreham. Has two lighthouses.

Block Printing. See *Block-books and Printing.*

Blocksberg, another name of the Brocken (which see).

Block-system, a system of working the traffic on railways according to which the line is divided into sections of a few miles, each section generally stretching from one station to the next, with a signal and telegraphic connection, at the end of the section. The essential principle of the system is that no train is allowed to enter upon any one section till the section is signaled wholly clear, so that between two successive trains there is not merely an interval of time, but also an interval of space.

Block-tin, tin at a certain stage of refinement, but not quite pure.

Bloemaert (blø'märt), ABRAHAM, a Dutch painter, born about 1565; died in 1651. He was the son of an architect and sculptor, who sent him to Paris, where he studied for three years, subsequently returning to Amsterdam and Utrecht, where he settled and painted all sorts of subjects, his landscapes being the most esteemed. He had four sons, of whom Cornelis (born 1603; died 1680) was sent by his father as an art student to Paris, and afterwards lived and worked in Rome as a distinguished engraver.

Bloemfontein (blø'm'fon-tin). the chief town and seat

of government of the Orange River South Africa, 680 miles N.E. of Cape Town, situated in a high but healthy region. Pop. (1911) 26,929.

Blois (blwä), capital of the French dep. Loir-et-Cher, 99 miles S.W. Paris, on the Loire. It consists of an upper town, a lower town, and several suburbs, with one of which it communicates by a stone bridge of eleven arches. The old castle, which has played an important part in French history, was restored by the government since 1871. There is also a cathedral of late date, the Church of St. Nicholas (12th century), a bishop's palace, Roman aqueduct, &c. The castle was long occupied by the counts of the name; and became a favorite residence of the kings of France.



Court of the Castle of Blois.

it Louis XII was born, and Francis I, Henry II, Charles IX, and Henry III held their courts.

Blomfield (blom'feld), CHARLES JAMES, Bishop of London, born at Bury-St.-Edmunds in 1788; died at Fulham Palace in 1857. At the bridge he took high honors; and filling successively several curacies, acting for a time as chaplain to the Bishop of London, was presented to the rectory of St. Botolph, Bishopsgate. In 1824 he was made Bishop of Chester, and in 1828 Bishop of London. He was a distinguished classical scholar, and published editions of several of the dramas of Æschylus and of the lyric poets. His chief distinction was gained by his activity in the management of his diocese, and his energy in the cause of church reformation.

Blond (blon), JACQUES CHRISTOPHER, a miniature painter and originator of color printing, born at Frankfurt-am-Main in 1670; died in a hospital.

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Blondel

Paris in 1741. He spent most of his life and all his means in comparatively unsuccessful experiments in printing engravings in color, and in attempts to reproduce the cartoons of Raphael in tapestry.

Blondel (blon-del). A French minstrel and poet of the twelfth century, and confidential servant and instructor in music of Richard Cœur de Lion. While his master was the prisoner of the Duke of Austria, Blondel, according to the legend, went through Palestine and all parts of Germany in search of him. He sang the king's own favorite lays before each keep and fortress till the song was at length taken up and answered from the windows of the castle of Loewenstein, where Richard was imprisoned. This story is preserved in the Chronicles of Rheims, of the thirteenth century, but probably has no foundation in fact. The poems of Blondel, with all the legendary and historical data relating to him, were published by Prosper Tarbé (Rheims, 1862).

Blood (blud), the fluid which circulates through the arteries and veins of the body of man and of other



BLOOD CORPUSCLES, MAGNIFIED.
a, man. b, goose. c, crocodile. d, frog. e, skate.

animals and is essential to the preservation of life and nutrition of the tissues. This fluid is more or less red in vertebrates, except in the lowest fishes. In insects and in others of the lower animals there is an analogous fluid which may be colorless, red, bluish, greenish, or milky. The venous blood of mammals is a dark red, but in passing through the lungs it becomes oxidized and acquires a bright scarlet color, so that the blood in the arteries is of a brighter hue than that in the veins. The central organ of the blood circulation is the heart (which see). The specific gravity of human blood varies from 1.045 to 1.075, and its normal temperature is 99° Fahr. The blood contains water, about 90 per cent, fibrin, albumin, blood corpuscles, both red and white, fatty substances and various animal matters and salts. When ordinary blood stands for a time it separates into two portions, a red coagulated mass consisting of the fibrin, corpuscles, etc., and a yellowish watery portion, the serum. The blood corpuscles or globules are characteristic of the fluid. These are minute, red and white bodies floating in

the fluid of the blood. The red ones give color to the fluid, and are biconcave discs, oval in birds and reptiles, and round in man and most mammals. In man they average $\frac{1}{8000}$ inch in diameter, and in the Proteus, which has them larger than any other vertebrate, $\frac{1}{6000}$ inch in length and $\frac{1}{4271}$ in breadth. The white or colorless corpuscles, called *leucocytes*, are the same as the lymph corpuscles, and are spherical or lenticular, nucleated, and granulated, and rather larger than the red globules and number from 12,000 to 20,000 per cubic millimeter.

Blood, AVENGER OF, in Scripture, the nearest relation of any one that had died by manslaughter or murder, so called because it fell to him to punish the person who was guilty of the deed.

Blood, THOMAS (commonly called Colonel Blood), born in Ireland about 1618; died at London in 1680; was a dishanded officer of Oliver Cromwell, and lost some estates in Ireland at the Restoration. His whole life was one of plotting and adventure, though it is probable that he acted a double part, keeping the government informed of so much as might secure his own safety. His most daring exploit was an attempt to steal the crown jewels (9th May, 1671) from the Tower. He was seized with the crown in his possession, but was not only pardoned by Charles, but obtained forfeited Irish estates of £500 annual value.

Bloodbird (*Myzomela sanguinolenta*), an Australian species of honey-sucker so called from the rich scarlet color of the head, breast, and back of the male.

Blood-cells, or BLOOD-CORPUSCLES. See Blood.

Bloodflower, the popular name for some of the red-flowered species of *Hemanthus*, a genus of bulbous plants of the Amaryllis family, natives of the Cape of Good Hope. The most common species is *Hemanthus coccineus*, or Cape Tulip, a very showy plant, the bulb of which is used as a diuretic.

Bloodhound, a variety of dog with long, smooth and pendulous ears, remarkable for the acuteness of its smell, and employed to recover game or prey which has escaped wounded from the hunter, by tracing the lost animal by the blood it has spilt: whence the name of the dog. There are several varieties of this animal, as the English, the Cuban, and the African bloodhound. In former times bloodhounds were not only trained to the pursuit of game, but also to the chase of man. In America

they used to be employed in hunting fugitive slaves. The general idea, how-



Bloodhound.

ever, that they attack and wound the fugitive when overtaken is an error.

Bloodletting. See *Phlebotomy*.

Blood-money, the compensation by a homicide to the next of kin of the person slain, securing the offender and his relatives against subsequent retaliation; once common in Scandinavian and Teutonic countries, and still a custom among the Arabs. The term is also applied to money earned by laying or supporting a charge implying peril to the life of an accused person.

Blood Poisoning, a term commonly applied to septicæmia and allied diseases and in a wider sense to the effects on the human system of poison germs from any source.

Blood-rain, showers of grayish and reddish dust mingled with rain which occasionally fall, usually in the zone of the earth which extends on both sides of the Mediterranean westwardly over the Atlantic, and eastwardly to Central Asia. The dust is largely made up of microscopic organisms, especially the shells of diatoms, the red color being due to the presence of a red oxide of iron.

Bloodroot (*Sanguinaria Canadensis*), a plant of Canada and the United States, belonging to the poppy order, and so named from its root-stock yielding a sap of a deep-orange color. Its leaves are heart shaped and deeply lobed, the flower grows on a scape and is white or tinged with rose. The plant has acrid, narcotic properties, and has been found useful in various diseases. *Geum Canadense*, another American plant used as a mild tonic, is also known as bloodroot.

Bloodstone. See *Heliotrope*.

Bloodvessels are the tubes or vessels in which the blood circulates. See *Arteries*, *Veins*, and *Heart*.

Bloodwood, a name of several trees. *Indian bloodwood* (*Lagerstræmia floribunda*) is a large tree of the henna family with wood of a blood red color, used for many purposes. is called also *jarool*.

Bloodwort, in the United States *Hieracium venosum*.

Bloody Assizes, those held by Judge Jeffreys in 1685 after the suppression of Monmouth rebellion. Upwards of 300 persons were executed after short trials, with little regard to evidence; very many were whipped, imprisoned, and fined; and nearly 1000 were sent as slaves to the American plantations.

Bloom (blöm), a lump of puddled iron which leaves the furnace in a rough state, to be subsequently rolled in the bars or other material into which it may be desired to convert the metal. Also a lump of iron made directly from the ore by a furnace called a 'bloomer'.

Bloomer Costume, adopted by the year 1849 by Mrs. Bloomer of New York, who proposed thereby to effect a complete revolution in female dress and add materially to the health and comfort of women. It consisted of a jacket with close sleeves, a skirt reaching a little below the knee, and a pair of Turkish pantaloons.

Bloomfield (blöm'feld), a town in Essex Co., New Jersey, 12 miles N. W. of New York, and a residential city of New York and New Jersey business people. Has various manufactures. Pop. 15,070.

Bloom'field, ROBERT, an English poet, born at Honington, Suffolk, in 1766; died in 1823. In 1781 was sent to learn the trade of a shoemaker with his brother in London. the country, where he resided for a short time in 1786, he first conceived the idea of his poem the *Farmer's Boy*, which was written under the most unfavorable circumstances in a London garret. It was published in 1800, and had a great popularity. He subsequently published *Rural Tales*, *Wild Flowers*, *The Banks of the Wye*, *May Day with the Nurses*, etc. Several efforts were made to place him in good circumstances, but he died in poverty.

Bloomington (blöm'ing-ton), a city and county seat of Montgomery Co., Indiana; 55 miles S. S. W. of Indianapolis; with extensive manufactures of wooden ware, gloves, baskets, electric batteries, etc.; and important limestone quarries in vicinity. Here is the Indiana State University. Pop. 10,300.

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Bloomington

Bloom'ington, a thriving city of Illinois, 60 m. N. N. E. of Springfield, county seat of McLean County. It is one of the chief railroad centers of the State and has several important educational institutions, including the Illinois Wesleyan University, and the State Normal University. Has coal-mines, iron industries, railroad shops, canneries, candy factory, etc., and is a center for agricultural implements. Pop. 30,000.

Bloomsburg (blöms'burg), capital of Columbia Co., Pennsylvania, 39 miles s. w. of Wilkes-Barre. Here is a state normal school, and iron and textile industries, etc. Pop. 8200.

Blouet (blu-a), PAUL, a writer, born in Brittany, France, in 1848; died in 1903. He was severely wounded in the Franco-German war, was subsequently a newspaper correspondent and a lecturer, and wrote works of humorous criticism on Great Britain and the United States under the name of 'Max O'Rell.' His books are *John Bull and His Island*, *A Frenchman in America*, etc.

Blount (blunt), CHARLES, son of Sir H. Blount, born in 1654; a delistical writer, said to have had the assistance of his father in writing a work called *Anima Mundi, or a Historical Account of the Opinions of the Ancients concerning the Human Soul after Death*, etc. He wrote various other works of the same nature, and also an excellent treatise on the liberty of the press. He shot himself 1693.

Blount, WILLIAM, American statesman, born in North Carolina in 1744. In 1782-83 and in 1786 and 1787 he was a delegate to the Continental Congress, president of the convention that formed the state of Tennessee in 1796, and the first United States senator from that state. Later impeached, he was expelled from the Senate, a proceeding that increased his popularity at home, where he became state senator.

Blouse (blouz), a light loose upper garment, resembling a smock-frock, made of linen or cotton, and worn by men as a protection from dust or in place of a coat. A blue linen blouse is the common dress of French workmen.

Blow (blö), JOHN, a musical composer, born in 1648; died in 1708. He became organist of Westminster Abbey, and was afterwards appointed composer to the Royal Chapel. His secular compositions were published under the name of *Amphion Anglicus*.

Blowfly, a name for *Musca vomitoria*, *Sarcophaga carnaria*, and other species of two-winged flies that deposit their eggs on flesh, and thus taint it.

Blowpipe

Blowitz, HENRY GEORGE DE, journalist, born at Pilsen, Bohemia, in 1825; died in 1903. He became a citizen of France in 1870, and after 1871 was the chief Paris correspondent of the *London Times*. He was noted for the accuracy and importance of his letters to the *Times*, was the most notable of interviewers, and was the channel through which Gambetta, Bismarck, the sultan, and others of leading position made public their views.

Blowing-machine, any contrivance for supplying a current of air, as for blowing glass, smel-

ing iron, renewing the air in confined spaces, and the like.

This may consist of a single pair of bellows, but more generally two pairs are combined to secure continuity of current. The most perfect blowing-machines are those in which



Fan-blower.

the blast is produced by the motion of pistons in a cylinder, or by some application of the fan principle. For smelting and refining furnaces, where a blast with a pressure of 3 or 4 lbs. to the square inch is required, blowing-engines of large size and power, worked by steam, are employed.

Blow'pipe, an instrument by which a current of air or gas is driven through the flame of a lamp, candle, or gas jet, and that flame directed upon a mineral substance, to fuse or vitrify it, an intense heat being created by the rapid supply of oxygen and the concentration of the flame upon a small area. In its simplest form it is merely a conical tube of brass, or other substance, usually 7 inches long and $\frac{3}{4}$ inch in diameter at one end, and tapering so as to have a very small aperture at the other, within 2 inches or so of which it is bent nearly to a right angle, so that the stream of air may be directed sideways to the operator. The flame is turned to a horizontal direction, assumes a conical shape, and consists of two parts of different colors. The greatest heat is obtained at the tip of the inner blue flame. Here the substance subjected to it is burned or oxidized, a small piece of lead or copper, for instance, being converted into its oxide. Hence the name of the *oxidizing* flame. By shifting the substance to the interior blue flame, which is wanting in oxygen, this element will be abstracted from the substance, and

a metallic oxide, for instance, will give out its metal; hence this is called a *reducing flame*. Thus various minerals can be either oxidized or reduced at pleasure, and the pipe forms a ready test in the hands of the mineralogist, who may use fluxes along with substances tested, watch how they color the flame, what vapor they give out, etc. The blowpipe may be provided with several movable nozzles to produce flames of different sizes. The current of air is often formed by a pair of bellows instead of the human breath, the instrument being fixed in a proper frame for the purpose. A very powerful blowpipe is the oxyhydrogen or compound blowpipe, an instrument in which oxygen and hydrogen (in the proportions necessary to form water), propelled by hydrostatic or other pressure, and coming from separate reservoirs, are made to form a united current in a capillary orifice at the moment when they are kindled. Another form is the oxyacetylene blowpipe, by means of which a still higher temperature is obtained than by the oxyhydrogen flame. The blowpipe is used by goldsmiths and jewelers in soldering, by glassworkers in sealing the ends of tubes, etc., and extensively by chemists and mineralogists in testing the nature and composition of substances.

The name is also given to the pipe or tube through which poisoned arrows are blown by the breath, used by South American Indians and natives of Borneo. The tube or blowpipe is 8 to 12 feet long, with a bore scarcely large enough to admit the little finger; and the arrow is forced through by a sudden expulsion of air from the lungs (like a pea from a boy's pen-shooter), being sometimes propelled to a distance of 140 yards.

Blubber (blub'er), the fat of whales and other large sea animals, from which train-oil is obtained. The blubber lies under the skin and over the muscular flesh. It is eaten by the Eskimo and the sea-coast races of the Japanese islands, the Kuriles, etc. The whole quantity yielded by one whale ordinarily amounts to 40 or 50, but sometimes to 80 or more cwts.

Blücher (blü'cher), **GEBHARD LEBE-RECHT VON**, a distinguished Prussian general, born at Rostock in 1742; died at Kriebowitz, Silesia, in 1819. He entered the Swedish service when 14 years of age and fought against the Prussians, but was taken prisoner in his first campaign, and was induced to enter the Prussian service. Discontented at the promotion of another officer over his head, he left the army, devoted himself to agriculture, and by industry and pru-

dence acquired an estate. After the death of Frederick II he became a major in his former regiment, which he commanded with distinction on the Rhine in 1793 and 1794. After the battle of Kyrweiler in 1794 he was appointed major-general of the army of observation stationed on the Lower Rhine. In 1802, in the name of the King of Prussia, he took possession of Erfurt and Mühlhausen. Oct. 1, 1806, he fought at the battle of Auerstädt. After the Peace of Tilsit he labored in the department of war at Königsberg and Berlin. He then received the chief military command in Pomerania, but the instigation of Napoleon was afterwards, with several other distinguished men, dismissed from the service. In the campaign of 1812, when the Prussians assisted the French, he took no part; but no sooner did Prussia rise against her oppressors than Blücher, then seven-



Blücher.

years old, engaged in the cause with his former activity, and was appointed commander-in-chief of the Prussians against the Russian corps under General Wittgenstein. His heroism in the battle of Lützen (May 2, 1813) was rewarded by the Emperor Alexander with the order of St. George. The battles of Bautzen and Hanau, those on the Katzbach and Leipzig, added to his glory. He was raised to the rank of field-marshal, and led the Prussian army which invaded France early in 1814. After a period of obstinate conflict the day of Montmartre crowned this campaign, and, March 20, Blücher entered the capital of France. His king, in remembrance of the victory which he had gained at the Katzbach, created him Prince of Wahlstadt. On the renewal of the war in 1815 the chief command was again committed to him, and he led his army into the Netherlands.

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15 Napoleon threw himself upon him, and Blücher, on the 16th, was defeated at Ligny. In this engagement his horse was killed, and he was thrown under its body. In the battle of the 18th Blücher arrived at the most decisive moment upon the ground, and taking Napoleon in the rear and flank assisted materially in completing the great victory of Waterloo. He was a rough and fearless soldier, noted for his energy and rapid movements, which had procured him the name of 'Marshal Vorwärts' (Forward).

Blue, one of the seven colors into which the rays of light divide themselves when refracted through a glass prism, seen in nature in the clear expanse of the heavens; also a dye or pigment of this hue. The substances used as blue pigments are of very different natures, and derived from various sources; they are all compound bodies, some being natural and others artificial. They are derived almost entirely from the vegetable and mineral kingdoms. The principal blues used in painting are *ultramarine*, which was originally prepared from lapis-lazuli or azure-stone—a mineral found in China and other oriental countries—but, as now prepared, it is an artificial compound of china-clay, carbonate of soda, sulphur, and rosin; *Prussian or Berlin blue*, which is a compound of cyanogen and iron; *blue bice*, prepared from carbonate of copper; *indigo blue*, from the indigo plant. Besides these, there are numerous other blues used in art, as *blue-verditer*, *smalt*, and *cobalt-blue*, from cobalt, *lacmus*, or *litmus*, etc. Before the discovery of aniline or coal-tar colors dyers chiefly depended for their blues on *wood*, *archil*, *indigo*, and *Prussian blue*, but now a series of brilliant blues are obtained from coal-tar, possessing great tinctorial power and various degrees of durability.

Blue, VICTOR, American naval officer, born in South Carolina, Dec. 6, 1865. Was graduated at the United States Naval Academy in 1887. During the war with Spain, he was landed at Acerranderon, Cuba, June 11, 1898, and successfully reconnoitred the position of Admiral Cervera's fleet, making an expedition of 72 miles, wholly within the enemy's lines.

Bluebeard, the hero of a well-known tale, originally French, founded, it is believed, on the enormities of a real personage, Gilles de Laval, Count de Retz, a great nobleman of Brittany, put to death for his crimes in 1440.

Bluebell, a name given to the wild hyacinth (*Scilla nutans*), and to the harebell (*Campanula rotundifolia*).

Blueberry, an American species of whortleberry or huckleberry (*Vaccinium Pennsylvanicum*), bearing a small black berry of pleasant flavor, and much used as a dessert fruit.

Bluebird, a small dentirostral, insectivorous bird, the *Sylvia*, or *Sialia sialis*, very common in the United States. The upper part of the body is blue, and the throat and breast of a dirty red. It makes its nest in the hole of a tree or in the box that is so commonly provided for its use by the friendly farmer. The bluebird is the harbinger of spring to the Americans; its song is cheerful, continuing with little interruption from March to October, but is most frequently heard in the serene days of spring. It is also called *blue robin* or *blue redbreast*, and is regarded with the same sort of sentiments as the robin of Europe.

Bluebooks, the official reports, papers, and documents printed for the British government and laid before the Houses of Parliament. They are so called simply from being stitched up in dark-blue paper wrappers; also, in America and England, a book containing the names of all persons holding public offices, with other particulars.

Bluebottle, *Centaurea Cydonus*, bachelor's button, a rather tall and slender plant, with blue flowers, growing in cornfields.

Bluebottle Fly, a large blue species of blowfly (*Musca vomitoria*).

Bluebreast. Same as *Bluthroat*.

Blue-coat School. See *Christ's Hospital*.

Blue-eye (*Entomyza cyanotis*), a common and beautiful bird of New South Wales, of the class of honey suckers, and sometimes called the blue-cheeked honey-eater. Numbers are often seen clinging together and hanging in many positions frequently from the extreme ends of small branches.

Bluefield, a city, Mercer county, W. Va., 79 miles S. by E. of Charleston; has coal and coke industries. Pop. (1910) 11,188.

Bluefields, a town at the mouth of the Bluefields river, Nicaragua, Central America. Pop. 5000.

Bluefish (*Temnodon* or *Pomatomus saltator*), a fish common on the eastern coasts of America, allied to the mackerel, but larger, growing to the length of three feet or more.

Bluegowns, an order of Scottish paupers, to whom the kings annually distributed certain alms. The

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alms consisted of a blue gown or cloak, a purse containing as many shillings Scots (pennies sterling) as the years of the king's age, and a badge bearing the words 'pass and repass,' which protected them from all laws against mendicancy. Edlie Ochiltree, in Sir W. Scott's novel of *The Antiquary*, is a type of the class. The practice of appointing bedesmen was discontinued in 1833, and the last of them drew his final allowance from the exchequer in Edinburgh in 1863.

Bluegrass (*Poa pratensis*), an American pasture grass of great excellence, especially abundant in Kentucky, which is called the Bluegrass State.

Blue Island, a post-village of Cook Co., Illinois, 12 miles S. of Chicago. It has stone quarries, smelting works, brickyards, etc. Pop. 8043.

Blue Laws, a name for certain severe laws said to have been made in the early government of New Haven, Connecticut, dealing with breaches of manners and morality, but most of which probably never existed.

Blue Light. See *Bengal Light*.

Blue-mantle, one of the English pursuivants-at-arms, connected with the Herald's College.

Blue Mountains, the central mountain range of Jamaica, the main ridges of which are from 6000 to 8000 feet high. Also a mountain chain of New South Wales, part of the great Dividing Range. The highest peaks rise over 4000 feet above the sea. The range is now traversed by a railway, which attains a maximum height of 8494 feet.

Blue Nile. See *Nile*.

Blue Peter, a blue flag having a white square in the center, used to signify that the ship on which it is hoisted is about to sail.

Blue-pill, a preparation of mercury triturated with three parts of confection of roses till it loses its globular form. This is mixed with one part by weight of liquorice-root powder, so that 5 grains of the mixture contain 1 grain of mercury.

Blueprint, a ferricyanide positive print from a transparent negative original. B. P. paper is sensitized with ferricyanide, and acetic acid, and used for making blueprint photographs, and for copying transparent drawings and giving white lines on blue ground.

Blue Ridge, the most easterly ridge of the Alleghany or Appalachian Mountains, extending through Virginia and North Carolina, and under other names through Maryland, Pennsylvania and New York. The most elevated summits are the peaks of Otter (4000 feet) in Virginia. They are largely covered with forests of ash, hickory, oak, maple and other hardwood trees. The Blue Mountains of Pennsylvania and Virginia are the first westerly range of the Blue Ridge.

Blue Sky Laws are laws passed to prevent the operations of promoters of money-making schemes, so-called because the promises of these promoters are as "limitless as the blue sky." Such laws have been passed in 26 States, their purpose being to prevent the sale of fraudulent or deceptive issues of stock. Such sales have been sustained by decisions of some of the lower Federal courts, but a decision of the United States Supreme Court in 1911 dealing with the "blue sky" laws of Ohio, Michigan and South Dakota, has pronounced them legal, thus enabling the States to put an end to this nefarious method of defrauding ignorant purchasers of stock.

Bluestocking, a literary lady: applied usually with the imputation of pedantry. The term arose in connection with certain meetings held by ladies in the days of Dr. Johnson for conversation with distinguished literary men. One of these literary ladies was a Mrs. Benjamin Stillingfleet, who always wore blue stockings, and whose conversation at these meetings was so much prized that his absence at any time was felt to be a great loss, so that the remark became common, 'We can do nothing without the blue stockings'; hence the meetings were sportively called the *stocking clubs*, and the ladies who attended them *bluestockings*.

Bluestone, or BLUE VITRIOL, sulphate of copper, a dark-blue crystalline salt used in dyeing and for other purposes.

Bluthroat, a bird (*Cyanecula* sp.) with a tawny breast marked with a sky-blue crescent, inhabiting the northern parts of Europe and Asia. It is a bird of passage, and taken in great numbers in France for the table.

Blue Vitriol. See *Bluestone*.

Bluewing, a genus of American ducks, so called from the blue color of the wing-coverts. One species (*Querquedula discors*) is brought

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great quantities to market, the flesh being highly esteemed for its flavor.

Blumenbach (blō'men-bāh), JOHANN FRIEDRICH, a celebrated German naturalist, born 1752; died 1840. He studied at Jena and Göttingen, and wrote on the occasion of his graduation as M.D. a remarkable thesis on the varieties of the human race. He became professor of medicine, librarian, and keeper of the museum at Göttingen in 1778, where he lectured for fifty years. His principal works are the *Institutiones Physiologicae*, long a common text-book; *Handbuch der vergleichenden Anatomie* (Handbook of Comparative Anatomy), the best treatise that had appeared up to its date; and *Collectio Craniorum Diversarum Gentium*. The last work, published between 1790 and 1828, gives descriptions and figures of his extensive collection of skulls, still preserved at Göttingen. He advocated the doctrine of the unity of the human species, which he divided into five varieties, Caucasian, Mongolian, Negro, American, and Malay. His anthropological treatises, and the memoirs of his life by Marx and Flourens, were translated into English.

Blunderbuss (blund'ér-bus), a short gun with a very wide bore, capable of holding a number of bullets, and intended to do execution at a limited range without exact aim.

Blunt, JOHN HENRY, an English theological writer, born in 1823; died in 1884. He held various curacies, and finally was appointed to the living of Beverston, Gloucestershire.

Blunt, JOHN JAMES, an English divine, born in 1794; died in 1855; after 1839 he was Lady Margaret professor of divinity at Cambridge.

Boa (bō'a), a genus of serpents, family Boidae, having the jaws so constructed that these animals can dilate the mouth sufficiently to swallow bodies thicker than themselves. They are also distinguished by having a hook on each side of the vent; the tail prehensile; the body compressed and largest in the middle, and with small scales, at least on the posterior part of the head. The genus includes some of the largest species of serpents, reptiles endowed with immense muscular power. They seize deer and other animals, and crush them in their folds, after which they swallow them whole. The boas are peculiar to the hot parts of South America. The *Boa constrictor* is not one of the largest members of the genus, rarely exceeding 20 feet in length; but the name boa or *boa constrictor* is often given popularly to any of the large serpents of similar

habits, so as to include the Pythons of the Old World and the Anaconda and other large serpents of America.

Boabdil (bō-ab-dēl'), ABU-ABDULLAH, last Moorish king of Granada, gained the throne in 1481 by expelling his father, Mulei Hassan; and became the vassal of Ferdinand of Aragon. By his tyranny he provoked the hostility of his own subjects, and Ferdinand, taking advantage of the dissensions which prevailed, laid siege to Granada. The Moors made a valiant defense, but Boabdil capitulated, and retired to a domain of the Alpujarras assigned him by the victor. He afterwards passed into Africa, and fell in battle while assisting the King of Fes in an attempt to dethrone the King of Morocco.

Boadicea (bō-ad-i-sē'a), Queen of the Iceni, in Britain, during the reign of Nero. Having been treated in the most ignominious manner by the Romans, she headed a general insurrection of the Britons, attacked the Roman settlements, reduced London to ashes, and put to the sword all strangers to the number of 70,000. Suetonius, the Roman general, defeated her in a decisive battle (A.D. 62), and Boadicea, rather than fall into the hands of her enemies, put an end to her own life by poison.

Boar (bōr), the male of swine not castrated. The wild hog, the original of the domestic pig, is generally spoken of as the *wild boar*. See *Hog*.

Board (bōrd), a number of persons having the management, direction, or superintendence of some public or private office or trust; also an office under the control of an executive government, the business of which is conducted by officers specially appointed for that purpose.

Board of Education, an important section of city administration, having the interests of the schools to look after and the best methods of providing for the education of the young to consider. By the aid of such official bodies the condition of the schools in this country has been greatly improved.

Board of Trade, an association of business men of a city for the purpose of promoting its commercial interests; also often called 'chamber of commerce.' In 1868 a National Board of Trade was organized in this country, formed of delegates from the local boards and devoted to the discussion of topics of general commercial interest and the advancement of trade conditions. There are similar boards of trade in European countries.

that of Great Britain being an important department of the government, as having the great interests of British commerce to look after.

Boat (bôt), a small open vessel or water craft usually moved by oars or rowing. Of recent years gasoline motors, like those used in automobiles, have come largely into use in the moving of boats. The forms, dimensions, and uses of boats are very various, and some of them carry a light sail, replacing the oar. The boats belonging to a ship of war are the launch or long-boat, which is the largest, the barge, the pinnace, the yawl, cutters, the jolly-boat, and the gig. The boats belonging to a merchant vessel are the launch or long-boat, before mentioned, the skiff, the jolly-boat or yawl, the stern-boat, the quarter-boat, and the captain's gig. For boats used in trials of speed see *Rowing, Regatta*.

Boatbill, *Cancroma Cochlearia*, a South American bird of the family Ardeidae or herons, about the size of a common fowl, with a bill not unlike a boat with a keel uppermost; its chief food is fish.

Boatfly, *Notonecta glauca*, an aquatic hemipterous insect which swims on its back; the hind legs aptly enough resembling oars, the body representing a boat; hence the name.

Boat'swain (commonly pronounced bô'sn), a warrant-officer in the navy who has charge of the sails, rigging, colors, anchors, cables, and cordage. His office is also to summon the crew to their duty, to relieve the watch, etc. In the merchant service one of the crew who has charge of the rigging and oversees the men.

Bobbin (bob'in), a reel or other similar contrivance for holding thread. It is often a cylindrical piece of wood with a head, on which thread is wound for making lace; or a spool with a head at one or both ends, intended to have thread or yarn wound on it, and used in spinning machinery (when it is slipped on a spindle and revolves therewith) and in sewing-machines (applied within the shuttle).

Bobbinet (bob'in-et), a machine-made cotton netting, originally imitated from the lace made by means of a pillow and bobbins.

Bobbio (bob'be-ô), a small town of N. Italy, prov. Pavia, the seat of a bishop, with an old cathedral, and formerly a celebrated abbey founded by St. Columbanus.

Bob-o-link. See *Rico-bunting*.

Bobruisk (bo-brû'sk), a fortified town of Russia, government of Minsk, 88 miles S. E. of Minsk. Pop. 35,177.

Boccaccio (bók-kât'chô), GIOVANNI, Italian novelist and poet, son of a Florentine merchant, was born in 1313 at Certaldo, a small town in the valley of the Elsa, 20 miles from Florence; died there in 1375. He spent some years unprofitably in mercantile pursuits and the study of the canon law, in the end devoted himself entirely to literature. He found a congenial atmosphere in Naples, where many men of letters frequented the court of King Robert among the number being the great Petrarch. In 1341 Boccaccio fell in love with Maria, an illegitimate daughter of King Robert, who returned his passion with equal ardor, and was immortalized as Fiammetta in many of his literary creations. His first work, a romantic love-tale in prose, *Filocolo*, was written at her command; as was also the *Teseida*, the first heroic epic in the Italian language, and the first example of the ottava rima. In 1341 he returned to Florence at his father's command, and during three years' stay produced three important works, *Ameto*, *L'amorosa Visione*, and *L'amorosa Fiammetta*, all of which were connected with his mistress in Naples. In 1344 he returned to Naples, where Giovanna, the granddaughter of Robert who had succeeded to the throne, received him with distinction. Between 1344 and 1350 most of the stories of the *Decameron* were composed at her dictation or at that of Fiammetta. This work, which his fame rests, consists of 100 tales represented to have been related in equal portions in ten days by a party of ladies and gentlemen at a country house near Florence while the plague was raging in that city. The stories in this wonderful collection range from the highest pathos to the coarsest licentiousness. They are partly the invention of the author, and partly derived from the fabliaux of mediæval French poets and other sources. On the death of his father Boccaccio returned to Florence where he was greatly honored, and sent on several public embassies. Amongst others he was sent to Padua to communicate to Petrarch the tidings of his recall from exile and the restoration of his property. From this time an intimate friendship grew up between them which continued for life. They both contributed greatly to the revival of the study of classical literature, Boccaccio spending much time and money in collecting ancient manuscripts. In 1373 he was chosen by the Florentines to occupy

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chair which was established for the ex-
position of Dante's *Divine Commedia*.
His lectures continued till his death.
Among his other works may be mentioned
Filostrato, a narrative poem; *Il Ninfale
Fiesolano*, a love story; *Il Corbaccio*,
essie *Il Labirinto d'Amore*, a coarse satire
on a Florentine widow; and several Latin
works. The first edition of the *Decam-
eron* appeared without date or place, but
is believed to have been printed at Flor-
ence in 1469 or 1470. The first edition
with a date is that of Valdarfer, Venice,
1471; what is, perhaps, the only existing
perfect copy of this was sold in London
in 1812 for \$11,300.

Boccage (bok'-ash), MARIE ANNE DU,
a French poetess much ad-
mired and extravagantly praised by Vol-
taire, Fontenelle, Clairaut and others;
born in 1710; died in 1802. Her writings
comprise an imitation of *Paradise Lost*;
the *Death of Abel*; the *Amazons*, a trag-
edy; and a poem called the *Columbiad*.
Bocca Tigris, or BOGUE, the em-
bouchure of the prin-
cipal branch of the Chu Kiang, or Can-
ton river, China.

Boccherini (bok-ker-é-né), LUIGI, an
Italian composer of in-
strumental music, was born in 1740 at
Lucca; died at Madrid in 1805. His com-
positions consist of symphonies, sextets,
quintets, quartets, trios, duets, and sona-
tas for the violin, violoncello, and piano-
forte. He never composed anything for
the theater; and of church compositions
we find but one, his *Stabat Mater*.

Bochart (bo-shär), SAMUEL, a French
theologian and oriental
scholar, born at Rouen in 1599; died in
1661 at Caen, where he was a Protestant
clergyman. His chief works are his
Geographia Sacra (1646), and his
Hierozoicon, or treatise on the animals
of the Bible (1663).

Boche (bosh), French soldiers' slang
for a soldier in the German
army. (From *caboche*, square head.)

Bochnia (bok'-ni-a), a town in Galicia,
famous for its salt and gyp-
sum mines. Pop. of district, 48,000.

Bocholt (bok'-olt), a town of Prus-
sia, prov. of Westphalia, on
the Aa; cotton-spinning and weaving,
machinery, etc. Pop. 21,278.

Bochum (bok'-um), a Prussian town,
prov. of Westphalia, 5 miles
E. N. E. of Essen. It is a great seat of
steel and iron manufacture and has ex-
tensive coal mines. Pop. 136,931.

Bock, BOCKBIER (bok'-bër), a variety
of German beer made with more
malt and less hops than ordinary German
beer, and therefore sweeter and stronger.

Bockenheim (bok'-en-him), a town
of Germany, forming
a suburb of Frankfort-on-the-Main; flour-
ishing manufactures of machinery, etc.
Pop. 17,457.

Böckh (bëkh), PHILIPP AUGUST, an
eminent German classical anti-
quary, born at Carlsruhe in 1785; died at
Berlin in 1867. He was educated at Carls-
ruhe and Halle, and obtained in 1811 the
chair of ancient literature in the Univer-
sity of Berlin, where he remained for the
rest of his life. He opened a new era in
philology and archaeology by setting forth
the principle that their study ought to be
an historical method intended to repro-
duce the whole social and political life
of any given people during a given period.
Among his chief works are an edition of
Pindar (1811-22); *The Public Economy
of the Athenians*, 1817, translated into
English and French; *Investigations into
the Weights, Coins, and Measures of
Antiquity*, 1838; and *Documents con-
cerning the Maritime Affairs of Attica*,
1840. The great *Corpus Inscriptionum
Græcarum* was begun by him with the
intention of giving in it every Greek in-
scription known in print or manuscript.

Bocland, BOCKLAND, or BOOK-LAND,
one of the original English
modes of tenure of manor-land which
was held by a short and simple deed un-
der certain rents and free services. This
species of tenure has given rise to the
modern freeholds.

Bode (bo'de), JOHN ELERT, a German
astronomer, born in 1747; died in
1820. His best works are his *Astronom-
ical Almanac* and his large *Celestial At-
las* ('Himmelsatlas'), giving a catalogue
of 17,240 stars (12,000 more than in
any former chart).—*Bode's Law* is the
name given to an arithmetical formula,
previously made known by Kepler and
Titius of Wittenberg, expressing approx-
imately the distances of the planets from
the sun. It assumes the series 0, 3, 6, 12,
24, 48, 96, etc., each term after the second
being double the preceding term; to
each term 4 is added, producing the
series 4, 7, 10, 14, 28, 56, 100, etc. These
numbers are, with the exception of 28,
roughly proportional to the distances be-
tween the planets and the sun. The law
has no theoretical foundation.

Boden-see. See *Constance, Lake of*.

Bodenstedt (bö'den-stet), FRIEDRICH
MARTIN, a German poet
and miscellaneous writer, born in 1819.
Having obtained an educational appoint-
ment at Tiflis he published a work on the
peoples of the Caucasus (1848), and *A
Thousand and One Days in the East*,

which were very successful. In 1854 he was appointed professor of Slavic at Munich, and in 1858 was transferred to the chair of old English. He was afterwards a theatrical director at Mailingen, etc. Among the best of his poetical works are the *Songs of Mirza-Schaffy*, purporting to be translations from the Persian, but really original, which have passed through over 100 editions. He translated Shakspeare's *Sonnets*, and in conjunction with other writers issued a new translation of Shakspeare's works. He died in 1892.

Bodin (bo-dan'), JEAN, a French political writer, born about 1530; died in 1596. He studied law at Toulouse, delivered lectures on jurisprudence there, and afterwards went to Paris and practised. His great work *De la République* (1576) has been characterized as the ablest and most remarkable treatise on the philosophy of government and legislation produced from the time of Aristotle to that of Montesquieu.

Bodle (bod'l), a copper coin formerly current in Scotland, of the value of two pennies Scots, or the sixth part of an English penny. The name is said to have been derived from a mint-master of the name of Bothwell.

Bodleian (bod-lē'an) LIBRARY at Oxford, founded by Sir Thomas Bodley in 1598, opened in 1602. It claims a copy of all works published in Britain, and for rare works and MSS. It is said to be second only to the Vatican. It is estimated to contain about 500,000 books, besides 30,000 in manuscript. Sir Thomas Bodley, the founder (1544-1612), expended a large sum in acquiring rare and valuable books, and left an estate for the support of the library, and since his time a number of highly valuable collections have been given to it.

Bodmer (bod'mer), JOHANN JAKOB, a German poet and scholar, born near Zürich in 1698; died in 1783; was professor of history at Zürich for fifty years. Although he produced nothing remarkable of his own in poetry, he did great service by republishing the old German poets and by his numerous critical writings.

Bodmer, KARL, painter, was born in Zürich, Switzerland, in 1809. Many of his works were exhibited at the annual salons. He was a member of the Legion of Honor. He died October 31, 1893.

Bodoni (bo-dō'ni), GIAMBATTISTA, a celebrated Italian printer, born at Saluzzo in 1740; died in 1813. In 1758 he went to Rome, and was employed in the printing-office of the Prop-

aganda. He was afterwards at the head of the ducal printing-house in Parma, where he produced works of great beauty. His editions of Greek, Latin, Italian, and French classics are highly prized.

Boece (bois), or BOYCE, HECTOR, Scottish historian, was born at Dundee about 1485. He studied first at Dundee, and then at the University of Paris, where he became professor of philosophy in the College of Montaigu and made the acquaintance of Erasmus. About 1500 he quitted Paris to assume the principality of the newly-founded university of King's College, Aberdeen. In 1522 he published in Paris a history in Latin of the prelates of Mortlach at Aberdeen. Five years afterwards appeared the work on which his fame chiefly rests, the *History of Scotland*, in Latin, *Scotorum Historia a prima gentis origine*, etc. It abounds in fable, but the narrative seems to have been skillfully adjusted to the conditions of belief in his own time. In 1536 a translation of the history was published made by John Ballentyne or Bellenden for James V. He died in 1536.

Boehm (bām), JOSEPH EDGAR, sculptor, born at Vienna in 1834. His Hungarian parents; died in 1890. He studied art in Italy and Paris, and settled in England in 1862. He has executed many statues for public monuments, including those to Bunyan at Bedford, Carlyle and Tyndall on the Thames Embankment, Beaconsfield and Stanley at Westminster, etc., besides a great number of portrait-busts. In 1881 he was appointed sculptor-in-ordinary to the queen.

Boehme (beu'me), or BOEHM, JAKOB, a German mystical writer, born in 1575; died in 1624. He was apprenticed to a shoemaker in his fourteen year, and ten years later he was settled at Görlitz as a master-tradesman, married to the daughter of a thriving butcher of the town. He was much persecuted by the religious authorities, and his death the rites of the church were but grudgingly administered to him. Raised by contemplation above his circumstances, a strong sense of the spiritual, particularly of the mysterious, was constantly present with him, and he saw in all the workings of nature up to his mind a revelation of God, and even imagined himself favored by divine inspirations. His first work appeared in 1616, and was called *Aurora*. It contains his revelations on God, man, and nature. Among his other works are *Tribus Principiis, De Signatura Rerum, Mysterium Magnum*, etc. His writings

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Bohmeria

all aim at religious edification, but his philosophy is very obscure and often fantastic. The first collection of his works was made in Holland in 1675 by Henry Betke; a more complete one in 1682 by Gichtel (10 vols., Amsterdam). William Law published an English translation of them, 2 vols. 4to. A sect, taking their name from Boehme, was formed in England.

Bohmeria (bê-mô'ri-a), a genus of plants, order Urticaceæ or Nettles, closely resembling the stinging nettle. A number of the species yield tenacious fibers, used for making ropes, twine, net, sewing-thread. *B. nivea* is the Chinese grass, the Malay *ramée*, which is shrubby and 3 or 4 feet high. It is a native of China, Southeastern Asia, and the Asiatic archipelago, where and in India it has long been cultivated. The plant has been introduced into cultivation in parts of the United States, Algeria, France, etc., under its Malay name of *ramée* or *ramie*. The British government has also become interested in its cultivation in such of the colonies or dependencies as are favorable to its growth. See *Ramie*.

Bœotia (bê-ô'she-a), a division of ancient Greece, lying between Attica and Phocis, and bounded E. and W. by the Eubœan Sea and the Corinthian Gulf, respectively, had an area of 1119 square miles. The whole country was surrounded by mountains, on the S. Mounts Cithæron and Parnes, on the W. Mount Helicon, on the N. Mount Parnassus and the Opuntian Mountains, which also closed it in on the E. The northern part is drained by the Cephissus, the waters of which form Lake Copais; the southern by the Asopus, which flows into the Eubœan Sea. The country originally had a superabundance of water, but artificial drainage works made it one of the most fertile districts of Greece. The inhabitants were of the Æolian race. Most of the towns formed a kind of republic, of which Thebes was the chief city. Epaminondas and Pelopidas raised Thebes for a time to the highest rank among Grecian states. Refinement and cultivation of mind never made such progress in Bœotia as in Attica, and the term Bœotian was used by the Athenians as a synonym for dullness, but somewhat unjustly, since Hesiod, Pindar, the poetess Corinna, and Plutarch were Bœotians. Along with Attica, Bœotia now forms a nomarchy of the kingdom of Greece.

Boerhaave (bôr'hâ-vê), HERMANN, a celebrated Dutch physician, was born in 1668; died in 1738. Des-

Boethius

tined for the clerical profession, in 1683 he was sent to Leyden to study theology. In 1689 he received the degree of Doctor of Philosophy; soon after he began the study of medicine, and in 1693 was made Doctor of Medicine at Harderwyck. In 1701 the University of Leyden chose him to deliver lectures on the theory of medicine; and in 1709 he was appointed to the chair of medicine and botany. He now published his *Institutiones Medicæ in Usus Annus Exercitationis*, and *Aphorismi de cognoscendis et curandis morbis in Usus Doctrinæ Medicinæ*, the former expounding his medical system, the latter classifying diseases and treating of their cause and cure. In 1714 he was made rector of the university.

Boers (bôrs; Dutch, *boer*, a peasant or husbandman), the Cape-Dutch name for the farmers of Dutch origin in South Africa. In 1836-37 large numbers of the Boers, being dissatisfied with the British government in Cape Colony, migrated northward to what is now Natal. Here their ill treatment of the natives soon led to war, and the British interfered and ultimately (1843) annexed the country. The Boers now moved into the highland country, where they established the South African, or Transvaal, and the Orange River republics. The ill treatment of the natives again led to war, in which the British once more aided the Boers and again made their aid the basis of a claim to the country. The Boers took up arms, defeated the British, and established their independence in 1881. At a later date the discovery of gold in the Transvaal region led to the influx of a large number of foreign miners, mainly British, their city of Johannesburg increasing in size till it had 150,000 inhabitants. When these demanded citizenship and the Boer assembly refused it, fearing they would be swamped by the foreign vote, trouble began again, leading in 1899 to war. The fighting continued until 1902, becoming a guerrilla war in the end, and finally leading to a British conquest of the country and its annexation to Great Britain, the Boers receiving very favorable terms. Their countries now form part of the Union of South Africa, formed in 1910, in which the Boers are a large and influential section of the population.

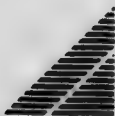
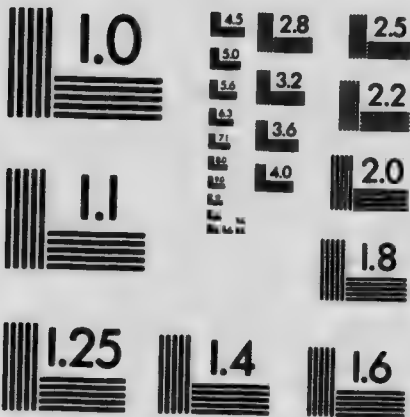
Boethius, a Latinized form of *Boece*. See *Boece*.

Boethius (bo-ê'thi-us), ANICIUS MANLIUS SEVERINUS, a celebrated Roman statesman and philosopher, was born about 470 A.D. in Rome or Milan, of a rich and noble family; executed in 525. Theodoric, king of the Ostrogoths



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then master of Italy, loaded him with marks of favor and esteem, and raised him to the first offices in the empire. He was three times consul, and received the greatest possible honor from people, senate, and king. But Theodoric, as he grew old, became irritable, jealous, and distrustful of those about him, and was influenced against his favorite by some whom Boethius had made enemies by his strict integrity and vigilant justice. He was finally accused of a treasonable correspondence with the court of Constantinople, imprisoned for a time, and then put to death. He made translations of the Greek philosophers, particularly Aristotle, which, in the middle ages, caused him to be regarded as the highest authority in philosophy. There is no evidence that he was a Christian. His fame now chiefly rests on his *Consolations of Philosophy*, written in prison, partly in prose and partly in verse, a work of elevated thought and diction. There is an Anglo-Saxon translation of it by King Alfred, of England, and it was early translated into other languages.

Bog, a piece of wet, soft, and spongy ground, where the soil is composed mainly of decaying and decayed vegetable matter. Such ground is valueless for agriculture until drained, but often yields an abundance of peat for fuel. A bog seems usually to be formed as follows:—A shallow pool induces the formation of aquatic plants, which gradually creep in from the borders to the deeper center. Mud accumulates round their roots and stalks, and a semifluid mass is formed, well suited for the growth of moss, particularly *Sphagnum*, which now begins to luxuriate, continually absorbing water, and shooting out new plants above as the old decay beneath; these are consequently rotted, and compressed into a solid substance, gradually replacing the water by a mass of vegetable matter. A layer of clay, frequently found over gravel, assists the formation of a bog by its power of retaining moisture. When the subsoil is very retentive, and the quantity of water becomes excessive, the superincumbent peat sometimes bursts forth and floats over adjacent lands. Bogs are generally divided into two classes; red bogs, or peat-mosses, and black bogs, or mountain mosses. The former class is found in extensive plains, frequently running through large districts, such as the Bog of Allen in Ireland, the depth varying from 12 to 42 ft. Their texture is light and full of filaments, and is formed by the slow decay of mosses and plants of different kinds. The lower part, being more entirely decayed, ap-

proaches nearer to the nature of humus than the upper portion, and, as being more carbonaceous, is more valuable for fuel. Black bog is formed by a more rapid decomposition of plants. It is heavier and more homogeneous in quality, but is usually found in limited and detached portions, and at high elevations, where its reclamation is more difficult. In Ireland bogs frequently rest on a calcareous subsoil, which is of great value in reclaiming them. In the reclamation of bog land a permanent system of drainage must be established; the loose and spongy soil must be mixed with a sufficient quantity of mineral matter to give firmness to its texture and fertilize its superabundant humus; proper manures must be provided to facilitate the extraction of nutriment from the new soil, and a rotation of crops adopted suitable for bringing it into permanent condition. The materials best adapted for reclaiming peat are calcareous earths, limestone gravel, shell-marl, and shell-sand. Thoroughly reclaimed bogs are not liable to revert to their former condition. Trunks of trees are often found in bogs (see *Bog-oak*), as are also bones of extinct animals.

Bogardus (bō-gar'dus), JAMES, an American inventor, born in 1800; died in 1874. Among his inventions were the 'ring-flyer' or 'ring-spinner' used in cotton manufacture (1828), the eccentric mill (1829), an engraving machine (1831) and the first dry gas-meter (1832). In 1839 he gained the reward offered for the best plan for carrying out the penny postage system by the use of stamps. In 1847 he built the first complete cast-iron structure in the world, and the first wrought-iron beams were made from his design. His delicate pyrometer and deep-sea sounding machine were valuable additions to scientific instruments.

Bog Asphodel (*Nartheceum ossifragum*), a liliaceous plant with a raceme of small, golden yellow, star-like flowers, common in early autumn on boggy mountain sides.

Bogatzky (bo-gätz'ke), KARL HEINRICH VON, German Protestant theological writer, born 1690; died 1774. His principal works are: *Schatz Kästlein der Kinder Gottes*, 1718; *Geistliche Gedichte*, 1749. The English translation of the former is well known by the title of *Bogatzky's Golden Treasury*.

Bog-butter, a fatty, spermaceti-like mineral resin found in masses in peat-bogs, composed of carbon, oxygen, and hydrogen.

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Boggs, FRANCIS M., artist, born at Springfield, Ohio, in 1855, and studied in Paris under Gerôme. His *Rough Day at Honfleur* won a prize in a New York competition, and his *La Place de la Bastille* was bought by the French government in 1882.

Boghead Coal, a brown cannel-coal of Scotland, found at Boghead, near Bathgate, and very valuable for gas and oil making.

Bog Iron-ore, a loose, porous, earthy ore of iron found in bogs and swamps, a hydrous peroxide, seldom occurring in such abundance as to render it of industrial importance.

Boglipoor. See *Bhagalpur*.

Bog Myrtle (*Myrica Gale*), also GALE, or SWEET GALE, an aromatic and resinous plant which covers large areas of bog and wet moorland, and was formerly put to many domestic uses, its twigs being used for beds and its roots and leaves as a substitute for hops. Wax was obtained from the berries. See *Candleberry*.

Bog-oak, trunks and large branches of oak found embedded in bogs and preserved by the antiseptic properties of peat, so that the grain of the wood is little affected by the many ages during which it has lain interred. It is of a shining black or ebony color, derived from its impregnation with iron, and is frequently converted into ornamental pieces of furniture and smaller ornaments, as brooches, ear-rings, etc.

Bogodukhoff (bog-o-duk-hof'), a town of Russia, in the government of Kharkov, with a considerable trade. Pop. 20,000.

Bogomili (bō-gō-mē'lē), an ascetic and mystical sect of the Greek Church founded in the 12th century. They held that God had two sons, Sathaniel and Logos, the former of whom rebelled and created the material world, but was finally subdued by the Logos or Christ. The sect was powerful in Bulgaria for about five centuries, and by its method of teaching did much to preserve and circulate old legends and folk-lore, including many early versions of Oriental fictions.

Bog-ore. See *Bog Iron-ore*.

Bogoss, a Hamitic people of Northern Abyssinia, occupying a fine plateau and mountain district, and numbering about 10,000, almost entirely engaged in cattle-rearing, though there is some tillage and a trade in corn, butter, ivory, skins, buffalo-horns, and ostrich feathers. The men are well built and

fairly handsome, the women of a lower type. They have peculiar patriarchal institutions with regularly established laws. The religion is the Christian, but Mohammedanism has a considerable number of adherents. Their chief village is Keren.

Bogotá (bō-gō-tā'; formerly *Santa Fé de Bogotá*), a city of South America, capital of Colombia and of the state or department of Cundinamarca, and seat of an archbishop, situated on an elevated plain 8863 feet above the sea, at the foot of two lofty mountains. Bogotá being subject to earthquakes, the houses are low, and strongly built of sun-dried brick. A number of handsomely laid out plazas have been preserved, ornamented with gardens and statuary. In Plaza Bolívar is a statue of Liberty by Pietro Tenerani, a pupil of Canova. Bogotá has always taken an interest in education, and because of this has been called the 'Athens of South America.' There is a public library of 50,000 volumes. There are a university, several colleges, observatory, botanic garden, theater, mint, etc. Bogotá is an emporium of internal trade, and has manufactures of soap, cloth, leather, etc., but not of much importance. It was founded in 1538. Pop. about 125,000.—The plateau of Bogotá is drained by the river Bogotá or Funza, which forms the fall of Tequendama, 475 feet high.

Bogra, a district and town of Bengal, India. Area of the division, 1350 sq. miles. Pop. of district (1901), 854,533; of town, 7094.

Bog Spavin, a name applied to a lesion of the hock-joint of the horse, due to distention of the capsule enclosing the joint. As the result of a severe sprain, it produces considerable lameness. The acute symptoms readily subside, but a permanent swelling may remain.

Bog-trotter, a term originally applied contemptuously to the Irish peasantry from the ability shown by them in crossing their native bogs by leaping from tussock to tussock—a frequent means of escape from police and soldiery.

Bogue (bōg), an acanthopterygian fish (*Bog*), family Sparidae, or gilt-heads, found in the Mediterranean, and sometimes on the coasts of Britain. The eyes are large and the general coloring brilliant.

Bogue (bōg), DAVID, the originator of the London Missionary Society, born in Berwickshire in 1750; died in 1825. He studied at Edinburgh, and was licensed as a preacher of the Church of Scotland. In 1771 he was employed as usher in London, and afterwards became minister of an independent chapel at Gosport, where he formed an institution

for the education of young men for the independent ministry. He then began the formation of the grand missionary scheme which afterwards resulted in the London Missionary Society, and took an active part in the foundation of the British and Foreign Bible Society and the Religious Tract Society. He wrote an essay on the *Divine Authority of the New Testament* (1802); *Discourses on the Millennium* (1813-16); and, in conjunction with Dr. Bennet, a *History of Dissenters* (1800-12).

Bogus (bō'gus), an Americanism meaning counterfeit, and applied to any spurious or counterfeit object; as, a bogus government, a bogus law. The origin of the term is uncertain.

Bohea (bo-hē), an inferior kind of black tea. The name is sometimes applied to black teas in general, comprehending Souchong, Pekoe, Congou, and common Bohea.

Bohemia (bō-hē'mi-a; Ger. *Böhmen*), a state in Czecho-Slovakia, till 1918 a part of the Austro-Hungarian monarchy (Austrian or Cisleithan portion), bounded by Bavaria, Saxony, Silesia, Moravia, and the republic (formerly the archduchy) of Austria; area, 20,060 sq. miles; population 6,318,280; more than 2,000,000 are Germans, the rest chiefly Czechs. The prevailing religion is the Roman Catholic, the country being an archbishopric with three bishoprics. The language of the country is the Czech dialect of the Slavonic (see *Czechs*). In some districts, and in most of the cities, German is spoken. Bohemia is surrounded on all sides by mountains, and has many large forests. Its plains are remarkably fertile. The chief rivers are the Elbe and its large tributary the Moldau. All sorts of grain are produced in abundance, as also large quantities of potatoes, pulse, sugar-beet, flax, hops (the best in Europe), and fruits. Wine is not abundant, but in some parts is of fairly good quality. The raising of sheep, horses, swine, and poultry is carried on to a considerable extent. The mines yield silver, copper, lead, tin, zinc, iron, cobalt, arsenic, uranium, antimony, alum, sulphur, plumbago, and coal. It is especially rich in coal, its mines being the most productive in Austro-Hungary. There are numerous mineral springs, but little salt. Spinning and weaving of linen, cotton, and woolen goods are extensively carried on; manufactures of lace, metal and wood work, machinery, chemical products, beet-root sugar, pottery, porcelain, etc., are also largely developed. Large quantities of beer (Pilsener) are exported. The glassworks of

Bohemia, which are known all over Europe, employ numerous workers. The trade, partly transit, is extensive. Prague, the capital, being the center of it. The largest towns are Prague, Pilsen, Reichenberg, Budweis, Teplitz, Aussig, and Eger. The educational establishments include the Prague University and upwards of 4000 ordinary schools.

Bohemia possesses a literature of considerable bulk, including in its works written in Czech by Moravian and Hungarian writers. The earliest fragment is doubtfully referred to the 10th century, and it was not till after the 13th century that it attained to any development. The next century was a period of great activity, and to it belong versified legends, allegorical and didactic poems, historical and theological works, etc. The most flourishing period of the older literature falls within 1400-1620, John Huss (1369-1415) having initiated a new era, which, however, is more fertile in prose works than in poetry. The following period, up to the beginning of the 19th century, was one of decline, but in recent times there has been a great revival, and in almost all departments Bohemian writers have produced works of merit.

Bohemia was named after a tribe of Gallic origin, the Boii, who were expelled from this region by the Marcomans at the commencement of the Christian era. The latter were obliged to give place to other Teutonic tribes, and these to the Czechs, a Slavic race who had established themselves in Bohemia by the middle of the 5th century, and still form the bulk of the population. The country was at first divided into numerous principalities. Christianity was introduced about 900. In 1092 Bohemia was finally recognized as a kingdom under Fruticus II. In 1230 the monarchy, hitherto elective, became hereditary. The monarchs received investiture from the German emperor, held one of the great offices in the imperial court, and were recognized as among the seven electors of the empire. Frequently at strife with its neighbors, Bohemia was successively united and disunited with Hungary, Silesia, Moravia, etc., according to the course of wars and alliances. Ottokar II (1253-78) had extended his conquests almost from the Adriatic to the Baltic, when he lost them and his life in contest with Rudolph, the founder of the house of Hapsburg. After the close of the Přemysl dynasty (which had held sway for about six centuries) by the assassination of Ottokar's grandson, Wenceslas III, the house of Luxemburg succeeded in 1310, and governed Bohemia till 1437, the reign of Charles IV (1346-

78) being especially prosperous. Towards the close of this second dynasty civil wars were excited by the spread of the Hussite movement, the central figure of the struggle being John Ziska, the leader of the Taborites. A temporary union between the moderate Hussites and the Catholics having proved a failure, the reformed party elected as king, in 1433, the Protestant noble, George Podibrad. On his death in 1471 they chose Wladislas, son of Casimir, king of Poland, who also obtained the crown of Hungary. His son Louis lost both crowns with his life in the battle of Mohacs against the Turks, and Ferdinand of Austria became in 1527 sovereign of both kingdoms. Bohemia then lost its separate existence, being declared a hereditary possession of the house of Austria. Its history, up till the European war, 1914-18, pertains to that of the Austrian Empire. (See *Austria-Hungary*.) At the close of the war Bohemia joined with Moravia in the establishing of the new state of Czecho-Slovakia (q. v.), which was formed in 1918.

Bohemian Brethren, a Christian sect of Bohemia, formed from the remains of the stricter sort of Hussites, in the latter half of the 15th century. They took the Scriptures as the ground of their doctrines throughout and sought to frame the constitution of their churches on the apostolic model. They had a rigid system of mutual supervision extending even to the minute details of domestic life. Being persecuted, numbers retired into Poland and Prussia. Those who remained in Moravia and Bohemia, and who had their chief residence at Fulneck in Moravia, were hence called *Moravian Brethren* (which see).

Bohemian Forest (*Böhmerwald*), a forested mountain ridge extending from the Fichtelgebirge southwards towards the confluence of the Elbe and the Danube, and separating Bavaria from Bohemia. The highest peaks are the Arber (4320 ft.) and the Rachel.

Bohemond (bō'he-mōnd), MARC, son of the Norman adventurer Robert Guiscard, who rose to be Duke of Apulia and Calabria, was born about 1056. After distinguishing himself in Greece and Illyria against Alexius Comnenus, he returned to find that in his absence his younger brother Roger had seized upon the paternal inheritance (1085). War ensued, but Bohemond, contenting himself with the principality of Tarentum, ultimately threw his energy into the Crusades. He took a leading part in the campaign in Asia Minor, captured Antioch (1098), and assumed the

principality; but was taken prisoner in 1101 and held captive for two years. In 1106 he married Constance, daughter of Philip I of France, and after an unsuccessful renewal of war with Alexius died at Canossa in 1111. Five of his descendants held in succession the principality of Antioch for over a century and a half.

Bohlen (bō'len), PETER VON, German orientalist, born in 1796; died in 1840. Having devoted himself to the oriental languages, he obtained an appointment at Königsberg in 1825 as extraordinary, and in 1830 as ordinary professor of oriental literature. The most important of his writings is *Das alte Indien* ('Ancient India').

Böhme. See *Boehme*.

Böhmisch-Leipa (beu'mish-li-pä), a town of Northern Bohemia, on the Polzen River. Pop. (1910) 12,297.

Bohn (bōn), HENRY GEORGE, an English bookseller, born at London, of a German family, in 1796; died in 1884. He was the publisher of the well-known 'Libraries,' or collection of standard works at moderate prices, to which he contributed some translations and works edited by himself; and he prepared an edition of Lowndes's *Bibliographer's Manual*, etc.

Bohol. See *Bojol*.

Böhtlingk (beut'lingk), OTTO, German Sanskrit scholar, born at St. Petersburg in 1815; chief work, a Sanskrit-German dictionary in 7 vols. (St. Petersburg, 1853-75), prepared in conjunction with Prof. Roth of Tübingen.

Boiardo (bō-yar'dō), MATTEO MARIA, Count of Scandiano, an Italian poet, scholar, knight, and courtier; born near Ferrara in 1434. From 1488 to 1494, the period of his death, he was commander of the city and castle of Reggio, in the service of Ercole d'Este, Duke of Modena. His chief poem was his uncompleted *Orlando Innamorato* (1495), a romantic epic, the principal Italian poem before the *Orlando Furioso*, of Ariosto, though now chiefly known by the *risacimento* of Berni. His other works include a comedy, *Il Timone*; *Sonnetti e Canzoni*; *Carmen Bucolicum*; *Cinque Capitoli in terza rima*; and translations from Lucian, Apuleius and Herodotus.

Boidæ (bō'i-dē), a family of large non-venomous serpents, with two mobile hooks or spurs, the rudiments of hind-legs, near the anus. The type genus is *Boa* (which see).

Boieldien (bō'ill-dyew), FRANÇOIS ADRIEN, a celebrated comp

born at Rouen in 1775. He early displayed great musical talent, his first opera, *La Famille Suisse*, being well received in 1795 at Rouen. In 1795 he repaired to Paris, and rose rapidly in reputation, producing several operas, of which the best was *Le Calife de Bagdad* (1799). Domestic difficulties drove him in 1802 to Russia, where he became musical director to the emperor. On his return to Paris in 1811 he produced, among other works, his two masterpieces, *Jean de Paris* (1812) and *La Dame Blanche* (1825), which placed him in the first rank of composers of French comic opera. For some years he was professor of composition and the piano-forte at the Conservatoire. He died of pulmonary disease in 1834.

Boii (boi'ë), a Celtic people, whose original seat is supposed to have been between the Upper Saône and the higher parts of the Seine and Marne. They migrated to Cisalpine Gaul, crossed the Po, and established themselves between it and the Apennines, in the country previously occupied by the Umbrians. After a more or less constant strife with the inhabitants of Southern Italy they attacked the Romans in support of Hannibal in B.C. 218, and though defeated, maintained the war until their subjugation by Scipio Nasica, B.C. 191. The remnant of the tribe sought refuge among the Tauriscans in the territory since called after them Bohemia, from which there was a later migration, about B.C. 58, to Bavaria, to which also they gave their name.

Boil, to heat a substance up to the point at which it is converted into vapor. The conversion takes place chiefly at the point of contact with the source of heat, and the bubbles of vapor, rising to the surface and breaking there, produce the commotion called *ebullition*. At the ordinary atmospheric pressure ebullition commences at a temperature which is definite for each substance. The escape of the heated fluid in the form of vapor prevents any further rise of temperature in an open vessel when the *boiling-point* has been reached. The exact definition of the boiling-point of a liquid is 'that temperature at which the tension of its vapor exactly balances the pressure of the atmosphere.' The influence of this pressure appears from experiments. In an exhausted receiver the heat of the human hand is sufficient to make water boil; while, on the contrary, in Papin's digester, in which it is possible to subject the water in the boiler to a pressure of three or four atmospheres, the water may be heated far above the normal boil-

ing-point without giving signs of ebullition. From this relation between the ebullition of a liquid and atmospheric pressure the heights of objects above sea-level may be calculated by comparing the actual boiling-point at any place with the normal boiling-point. (See *Heights, Measurement of*). The boiling-point of water as marked on Fahrenheit's thermometer is 212°; on the Centigrade, 100°; on the Réaumur, 80°. Ether boils at about 96°, mercury at 680°, sulphur at 838°.

Boil, a small, painful swelling of no definite shape, in the skin and subcutaneous tissues of the body. Its base is hard, while its apex (which is formed by the contained pus when it is mature) is soft and of a whitish color. In treating a boil suppuration should be stimulated by poultices and fomentation; afterwards an incision should be made, and the matter, consisting of dead cellular tissue and pus corpuscles, or core, squeezed out. A wet antiseptic dressing must be applied until pus no longer forms. The stomach should be relieved by purgatives and tonics administered. Anodynes are sometimes necessary when the constitutional irritation is very great. Boils are due to infection by pus-producing germs by means of a scratch, picking a pimple, etc.

Boileau-Despréaux (bwa-lô-dâ-prâ-ô), NICHOLAS (commonly called *Boileau*), a French poet, born in 1636 at Paris. He studied in the Collège d'Harcourt and in the Collège de Beauvais, and entered the legal profession: but soon left it to devote himself entirely to belles-lettres. In 1660 appeared his first satire, *Adieu d'un Poète à la Ville de Paris*, followed rapidly by eight others, and ultimately by three more, to complete the series. They attacked with much critical acumen, and in vigorous but finely-finished verse, the poets and writers of the older school. In 1664 he wrote his prose *Dialogue des Heros de Roman*, which sounded the knell of the artificial romances of the period. His *Epistles*, written in a more serious vein, appeared at various times from 1669 onwards; but his masterpieces were the *L'Art Poétique* and *Le Lutrin*, published in 1674—the former an imitation of the *Ars Poetica* of Horace with reference to French verse, the latter a mock heroic poem. In many respects his writings determined the trend of all subsequent French poetry, and he left, through his influence upon Dryden, Pope, and their contemporaries, a permanent mark upon English literature. For some time he held the post of historiographer

in connection with the Racine, and was elected academician in 1884, though only after the interference of the king in his favor. He died in 1711 of dropsy.

Boiler (boiler), a vessel constructed of wrought iron or steel plates riveted together, with needful adjuncts, in which steam is generated from water for the purpose of driving a steam-engine or for other purposes. The first important point in preparing a steam-boiler is to secure strength to resist the internal pressure of steam and prevent explosions; and accordingly the globular or spherical shape was very early adopted as one of greatest capacity, and as a shape which was not liable to distortion by pressure. It was set over an open fire, and the steam was confined until it was raised by the heat to the required pressure. But the open fire was wasteful of fuel, and the next step was to inclose the globular boiler in brickwork and conduct the flames in a flue winding round the boiler, in contact with it. The next form of boiler was the cylindrical, which stood upright like a bottle, the fire being placed at the bottom, and the flue winding round that part of the sides or walls of the boiler covered with water. For the sake of strength to resist the pressure of the steam, the bottom was hollowed or arched upwards, and it presented a concave dome to the radiant heat of the fire and the impact of the flames; and the top was made hemispherical. In process of time boilers of much larger size came to be required, and the horizontal wagon-shaped boiler was produced, and this was soon succeeded by the cylindrical boiler having hemispherical ends, in which simplicity and strength of design for higher pressures were combined.

For the sake of economy of fuel as well as of space, one or more cylindrical flues are commonly constructed within the boiler in all practical types of the present-day boiler. The burning gases from the fire, after having traversed the bottom of the boiler, return through the internal flue to the front, where the current is divided, and returns towards the chimney along both sides of the boiler. In the Cornish boiler, similarly constructed, the internal tube is made sufficiently large to receive the furnace inside the boiler; the boiler being 'internally fired,' in contrast with the other boilers which have been described, and are 'under-fired.' When two large furnace-tubes for internal firing are applied within the boiler it is known as the Lancashire boiler, and is the most generally prevailing type of boiler for purposes on land.

There are many varieties of boilers specially adapted to circumstances. The marine boiler now generally used is known as the Scotch boiler, consisting of

a short horizontal cylindrical steel shell with flat end plates and provided with several internal furnaces in cylindrical flues communicating with internal combustion chambers fitted with a large number of return tubes above the flues. Locomotive boilers are constructed with the multitubular flue, and the furnace or firebox, surrounded with water, is placed at one end. There are many forms of upright or vertical boilers, consisting of upright cylindrical shells—containing a firebox at the lower part, from which the burned gases are carried up through a single vertical flue, or the multitubular flue, to the chimney above. In another form of upright boiler, cross water-tubes are inserted in the upper part of the furnace, which absorb heat, both radiated and convected, and promote the circulation of the water in the boiler. Efficiency of boilers has been greatly increased by various improvements and mechanical devices, among which may be mentioned the superheater, which raises the temperature of saturated steam; and the mechanical stoker, which insures uniform and economical firing by securing more perfect combustion, used as it is with the traveling link grate. A system of forced draught is also made use of for the consumption of low-grade fuel.

Bois de Boulogne (bwā dē bō-lōn), a pleasant grove near the gates on the west of Paris, so named after the suburb Boulogne-sur-Seine. Its trees were more or less destroyed during the Franco-German war, but others have grown since, and it is one of the pleasantest Parisian holiday promenades. Formerly it was a famous dueling ground.

Boisé (boi-zā, Fr. bwā-zā), a city, the capital of Idaho, is on the Boise River, in a rich mining and lumbering district. It is also in a well irrigated section and is a shipping point for wool, hides and fruit. Pop. 25,000.

Bois-le-duc (bwā-lē-dük; Dutch *Hertogenbosch*), a fortified city of North Brabant, Holland, founded by Godfrey of Brabant in 1184, at the point where the Dommel and Aa unite to form the Diest; has manufactures of cloth, hats, cotton goods, etc., and a good trade in grain, its water traffic being equal to that of a considerable maritime port. The fortifications are of little modern value, but the surrounding country can be readily inundated at need. The cathedral is one of the finest in the Netherlands. Pop. 44,034. The English were defeated here by the French in 1794.

Boisserée (bwās-ra) GALLERY, a celebrated gallery of pictures in the Pinakothek or picture

gallery at Munich, collected by the brothers Sulpice (1783-1854) and Melchior Boissier. In 1827 King Ludwig of Bavaria purchased it.

Boissonade (bwa-so-nād), JEAN FRANÇOIS, a French classical scholar, born in 1774; died in 1857. He became in 1800 assistant of Larcher as Greek professor of the Faculty of Letters in Paris, and four years afterwards he succeeded him both in the Faculty and in the Institute. In 1816 he was elected academician, and in 1828 was called to the chair of Greek literature in the College of France.

Boissy d'Anglas (bwa-sē dāp-lā), FRANÇOIS ANTOINE, COMTE DE, a French statesman of the revolutionary period, born 1756; died 1826. In 1789 he was elected at Annonay to the States-general, and in 1792 to the Convention. He voted against the death of Louis XVI, and after the fall of Robespierre was appointed secretary of the Convention, and entrusted with the provisioning of Paris at a time of famine. He was made a member of the Council of Five Hundred in 1795, president of the Tribunal in 1803, senator and commander of the Legion of Honor in 1805, and a peer by Louis XVIII in 1814.

Bojador (boj-a-dōr'), a cape on the west coast of Africa, one of the projecting points of the Sahara; till the fifteenth century the southern limit of African navigation.

Bojol (bo-hol'), one of the Philippine Islands, north of Mindanao, about 40 m. by 30 m. Woody and mountainous. Pop. 243,148.

Boker (bō'ker), GEORGE HENRY, poet and dramatist, born at Philadelphia in 1823, became a lawyer, but never practised. In 1847 he published his first volume of poems, and next year his tragedy, *Calynos*, was successfully produced. He wrote other plays, the most famous of which is *Francesca Da Rimini*, often revived. Was author of a volume of patriotic poems written during Civil war. He died Jan. 2, 1890.

Bokhara, BOCHARA (bo-hā'rā), a khanate of Central Asia, vassal to Russia, bounded north by Russian Turkestan, west by Khiva and the Transcaspian Territory of Russia, south by Afghanistan, and east by Chinese Turkestan; area about 93,000 square miles. The country in the west is to a great extent occupied by deserts; in the east are numerous ranges of mountains. Cultivation is mainly confined to the valleys of the rivers, the chief of which is the Oxus or Amoo Daria, forming the southern boundary and running close to

the boundary on the west. The climate is warm in summer, but severe in winter; there is very little rain, and artificial irrigation is necessary. Besides cereals, cotton and tobacco are cultivated, and also a good deal of fruit. The total population, estimated at about 1,500,000, consists of the Usbek Tatars, who are the ruling race, and to whom the emir belongs; the Tajiks, who form the majority; Kirghis, Turcomans, Arabians, Persians, etc. The only two towns of importance are the capital, Bokhara, and Karshi. The capital, according to Vambéry the center of Tatar civilization, is behind the large towns of Western Asia in general luxury and comfort, though the country is distinguished from other countries of Central Asia by its numerous schools. The rule of the emir is theoretically absolute. The manufactures are unimportant, but there is a very considerable caravan trade, cotton, rice, silk, and indigo being exported, and woven goods, sugar, iron, etc., being imported. The trade has been greatly increased by the Russian Transcaspian railway, which crosses the country and reaches Samarkand, opening a market for the cotton and other products in Russia.

Bokhara was the ancient Sogdiana or Maracanda, capital Samarkand; was conquered by the Arabs in the 8th century, by Genghis Khan in 1220, and by Timur in 1370, and was finally seized by the Usbeks in 1505. It has recently suffered much from the advances of the Russians, who, in 1868, compelled the cession of Samarkand and important tracts of territory. Since then the Emir Muzafer-Eddin has sunk more and more into a position of dependency on Russia. After the Russian expedition to Khiva in 1873 an agreement was come to between Russia and Bokhara by which Bokhara received a portion of the territory ceded by Khiva to Russia, while the Russians received various privileges in return.

The khanate then came within the sphere of Russian domination. A Russian political agent was appointed and a Russian bank established at Bokhara, and the country was practically absorbed in Russian Turkestan, for what little power it had lapsed in 1884 on the annexation of Merv.—BOKHARA, the capital of the khanate, is 8 or 9 miles in circuit, and surrounded by a stone wall. The streets are narrow and the houses poorly built; principal edifices: the palace of the khan, crowning a height near the center of the town and surrounded by a brick wall 70 feet high; and numerous mosques, schools, bazaars, and caravansaries. The trade

was formerly large with India, but has been almost completely absorbed by Russia. Pop. about 70,000.

Bolama (bo-lá'má). See *Bissagos*.

Bolan (bo-lán') PASS, a celebrated defile in the Hala Mountains, N. E. of Beluchistan, traversed by a railway connecting Quetta with Sind in India. It is about 60 miles long, hemmed in on all sides by lofty precipices, and in parts so narrow that a regiment could defend it against an army. Since 1879 the Bolan route has been under British control and there is a British fortress at Quetta. The crest of the pass is 5800 feet high.

Bolas (bó'las; that is, 'balls'), a form of missile used by the Paraguay Indians, the Patagonians, and especially by the Gauchos of the Argentine Republic. It consists of a rope or line having at either end a stone, ball of metal, or lump of hardened clay. When used it is swung round the head by one end, and then hurled at an animal so as to entangle its limbs.

Bolbec (bol-bek), a town of France, dep. Seine-Inférieure, on the Bolbec, 21 miles E. N. E. Havre. Has large cotton mills; also produces handkerchiefs, linen and woolen stuffs, lace, etc. Pop. 10,959.

Bolchow (bol'hof). See *Bolkhoff*.

Bole (böl), an earthy mineral occurring in amorphous masses, and composed chiefly of silica with alumina, iron, and occasionally magnesia. It is of a dull yellow, brownish, or red color, has a greasy feel, and yields to the nail. In ancient times, under the name of Lemnian bole or earth, one variety of it had a place in the materia medica. At present the best known bole of commerce is a coarse pigment known as Berlin and English red.

Bolero (bo-lér'ō), a popular Spanish dance of the ballet class for couples or for a single female dancer. The music, which is in triple measure, is generally marked by rapid changes of time, and the dancers usually accompany the music with castanets. The interest of these dances largely depends upon the pantomime of passion, which forms an essential part of them.

Boletus (bo-lé'tus), a genus of fungi, order Hymenomycetes, family Polyporei. The characters of the genus are: broad, hemispherical cap, the lower surface formed of open tubes, cylindrical in form, and adhering to one another. The tubes can be separated from the cap, and contain little cylindrical capsules, which are the organs of reproduction.

Most of the species are globular. *Boletus edulis* has firm flesh and an agreeable nutty flavor, and is a considerable article of commerce in France, particularly around Bordeaux. Of the numerous other species of *Boletus*, many



Boletus.

1, knotted; 2, bronzed; 3, satanic.

are edible, and one, *B. ignarius*, furnishes the German tinder, and is used as an external styptic.

Boleyn (bul'in), ANNE, second wife of Henry VIII of England, eldest daughter of Sir Thomas Boleyn and Elizabeth Howard, daughter of the Duke of Norfolk; born, according to some authorities, about 1507. She became lady of honor to Queen Catharine. The king, who soon grew passionately enamoured of her, without waiting for the official completion of his divorce from Catharine, married Anne in January, 1533, having previously created her Marchioness of Pembroke. When her pregnancy revealed the secret, Cranmer declared the first marriage void and the second valid, and Anne was crowned at Westminster with unparalleled splendor. On Sept. 7, 1533, she became the mother of Elizabeth. She was speedily, however, in turn supplanted by her own lady of honor, Jane Seymour. Accusations of infidelity were made against her, and in 1536 the queen was brought before a jury of peers on a charge of treason and adultery. Smeaton, a musician, who was arrested with others, confessed that he had enjoyed her favors, and on May 17 she was condemned to death. The clemency of Henry went no further than the substitution of the scaffold for the stake, and

she was beheaded on May 19th, 1536. Whether she was guilty or not has never been decided; that she was exceedingly indiscreet is certain.

Bolides (bô'lîdz), a name given to those meteoric stones or aerolites that explode on coming in contact with our atmosphere.

Bolingbroke (bô'ling-brûk), HENRY ST. JOHN, VISCOUNT, English statesman and political writer, born in 1678 at Battersea, London; educated at Eton and at Oxford, where he had a reputation both for ability and libertinism. In 1700 he married a considerable heiress, the daughter of Sir Henry Winchcomb, but they speedily separated. In 1701 he obtained a seat in the House of Commons, attaching himself to Harley and the Tories. He at once gained influence and became secretary of war in 1706, though he retired with the ministry in 1708. He continued, however, to maintain a constant intercourse with the queen, who preferred him to her other counselors, and on the overthrow of the Whig ministry in 1710, after the Sacheverell episode, he became one of the secretaries of state. In 1712 he was admitted to the House of Lords with the title of Viscount Bolingbroke, and in 1713, against much popular opposition, concluded the Peace of Utrecht. At this period the Tory leaders were intriguing to counteract the inevitable accession of power which the Whigs would receive under the House of Hanover; but shortly after the conclusion of the peace a contention fatal to the party broke out between the lord high treasurer (Harley, Earl of Oxford) and Bolingbroke. Queen Anne, provoked by Oxford, dismissed him, and made Bolingbroke prime minister, but died herself four days later. The Whig dukes at once assumed the power and proclaimed the elector king. Bolingbroke, dismissed by King George while yet in Germany, fled to France in March, 1715, to escape the inevitable impeachment by which, in the autumn of that year, he was deprived of his peerage and banished. James, the English Pretender invited him to Lorraine and made him his secretary of state, but dismissed him in 1716 on a suspicion of treachery. He remained for some years longer in France, where (his first wife having died) he married the Marquise de Villette, niece of Madame de Maintenon, occupying himself with various studies. In 1723 he was permitted to return to England, living at first retired in the country in correspondence with Swift and Pope. He then joined the opposition to the Walpole ministry, which he attacked during eight

years in the *Craftsman* and in pamphlets with such vigor and skill that in 1735 a return to France became prudent, if not necessary. In 1742, on the fall of Walpole, he came back in the expectation that his allies would admit him to some share of power; but being disappointed in this respect, he withdrew entirely from politics and spent the last nine years of his life in quietude at Battersea, dying in 1751. He wrote in excellent and forcible style, his chief works being *A Dissertation upon Parties*; *Letters on the Spirit of Patriotism*, on the *Idea of a Patriot King*, and *On the State of Parties at the Accession of George I*; *Letters on the Study of History* (containing attacks on Christianity), and other works. Pope was indebted to him for suggestions for his *Essay on Man*. He was clever and versatile, but unscrupulous and insincere.

Bolivar (bô-lê'vâr), SIMON (El Libertador), the liberator of Spanish South America, was born at Caracas, July 24, 1783. He finished his education in Europe, and having then joined the patriotic party among his countrymen he shared in the first unsuccessful efforts to throw off the Spanish yoke. In 1812 he joined the patriots of New Granada in their struggle and having defeated the Spaniards in several actions he led a small force into his own country (Venezuela), and entered the capital, Caracas, as victor and liberator, Aug. 4, 1813. But the success of the revolutionary party was not of long duration. Bolivar was beaten by General Boves, and before the end of the year the royalists were again masters of Venezuela. Bolivar next received from the Congress of New Granada the command of an expedition against Bogotá, and after the successful transfer of the seat of government to that city retired to Jamaica. Having again returned to Venezuela he was able to rout the royalists under Morillo, and, after a brilliant campaign, effected in 1819 a junction with the forces of the New Granada republic. The battle of Boyaca which followed gave him possession of Santa Fé and all New Granada, of which he was appointed president and captain-general. A law was now passed by which the Republics of Venezuela and New Granada were to be united in a single state, as the *Republic of Colombia*, and Bolivar was elected the first president. In 1822 he went to the aid of Peru, and was made dictator, an office held by him till 1825, by which time the country had been completely freed from Spanish rule. In 1825 he visited Upper Peru, which formed itself into an independent republic named

Bolivia, in honor of Bolívar. In Colombia a civil war arose between his adherents and the faction opposed to him, but Bolívar was confirmed in the presidency in 1826, and again in 1828, and continued to exercise the chief authority until May, 1830, when he resigned. He died at Carthagena on the 17th December, 1830.—One of the states or departments of Colombia is named Bolívar after him.

Bolivia (bò-liv'i-a), originally called **UPPER PERU**, a republic of South America, bounded N. and E. by Brazil, S. by the Argentine Republic and Paraguay, and W. by Peru and Chile. Its area, according to recent estimates, is 708,195 sq. miles. As a result of the 1879-81 war with Chile, Bolivia ceded to that country her coast territory, covering about 29,000 sq. m., with a population of 22,000. The total pop. is 2,267,935. An unascertained proportion of the inhabitants belong to aboriginal races (the Aymaras and the Quichuas); the larger portion of the remainder being Mestizos or descendants of the original settlers by native women. The capital, formerly Sucre is now La Paz; other towns are Sucre or Chuquisaca, Potosí, Oruro, and Cochabamba. The broadest part of the Andes, where these mountains, encompassing Lakes Titicaca (partly in Bolivia) and Aullagas, divide into two chains, known as the Eastern and Western Cordilleras, lies in the western portion of the state. Here are some of the highest summits of the Andes, as Sorata, Illimani, and Sajama. The two chains inclose an extensive tableland, the general elevation of which is about 12,500 ft., much of it being saline and barren, especially in the south. The ramifications of the eastern branch extend a long way from the Cordillera, forming numerous valleys which pour their waters into the Pilcomayo, an affluent of the Paraguay, and into the Mamoré, Beni, and other great affluents of the Amazon. These spurs of the Eastern Cordillera are succeeded by great plains, in parts annually flooded to such a degree by the numerous rivers running through them that communication by boat is practicable for long stretches. In the southeast there is an extensive barren region with salt marshes. The waters of Lake Titicaca are conveyed to Lake Aullagas by the Desaguadero; the latter lake has only an insignificant outlet.

The climate, though ranging between extremes of heat and cold, is very healthy, and cholera and yellow fever are unknown. The elevated regions are cold and dry, the middle temperate and de-

lightful, the lower valleys and plains quite tropical. Among animals are the llama, alpaca, vicuña, chinchilla, etc.; the largest bird is the condor. Bolivia has long been famed for its mineral wealth, especially silver and gold, the total value of these metals from the discovery of the mines in 1545 to the present time exceeds \$3,000,000,000. The silver produce has fallen off greatly from past times and is now small. The celebrated Potosí was once the richest silver district in the world. The mining of tin became active in 1905, and this country in 1910 produced 40 per cent. of the world's yield of tin. Copper and nickel also are abundant. The country is capable of producing every product known to South America, but cultivation is in a very backward state. Coffee, coca, cacao, tobacco, maize, and sugarcane are grown, and there is an inexhaustible supply of India rubber. The imports and exports are roughly estimated at about \$16,000,000 and \$22,000,000, respectively. The chief exports are silver (two-thirds of the whole), cinchona or Peruvian bark, cocoa, coffee, caoutchouc, alpaca wool, copper, tin, and other ores. Roads are few and bad; and until these are improved and extended, railway construction carried on so as to communicate economically with the most important centers of industry, and the water communication by way of the Amazon and its tributaries taken advantage of, the trade must remain small. Accounts are kept in *bolivianos* or dollars, value from 40 to 48 cents.

By its constitution Bolivia is a democratic republic. The executive power is in the hands of a president elected for four years, and the legislative belongs to a congress of two chambers, both elected by universal suffrage. The finances are in a disorganized state; the revenue may amount to \$5,500,000. The debt (1910) was \$3,000,000. The religion is the Roman Catholic, and public worship according to the rites of any other church is prohibited. Education is at an exceedingly low ebb.

Bolivia under the Spaniards long formed part of the viceroyalty of Peru, at a later date it was joined to that of La Plata or Buenos Ayres. Its independent history commenced with the year 1825, when the republic was founded. The constitution was drawn up by Bolívar, in whose honor the state was named Bolivia; and was adopted by Congress in 1826. It has since undergone important modifications. But the country has been almost continually distracted by internal and external troubles, and can scarcely

be said to have had any definite constitution. It suffered severely in the war which, with Peru, it waged against Chile in 1879 and subsequent years, and which ended in the loss of territory already mentioned; and has suffered from a frequent state of anarchy since the close of that war.

Bolkhoff (bol'hof), an ancient town of Russia, gov. of Orel; the industries embrace leather and hemp, hosiery, tallow, gloves, soap. Pop. 26,395.

Boll Weevil (böl wə'vil), a small gray insect, the most serious pest of cotton in the United States. The damage done by the insect in 1907 was estimated at \$10,000,000.

Bollandists (bol'lan-dist), the society of Jesuits which published the *Acta Sanctorum*, a collection of lives of the saints of the Roman Catholic Church. They received this name from John Bolland (d. 1665), who edited the first five volumes from materials already accumulated by Heribert Rosweyd, a Flemish Jesuit (d. 1629). The society was first established at Antwerp, removed to Brussels after the abolition of the society of Jesuits in 1773, and dispersed in 1794. A new association was formed in 1837 under the patronage of the Belgian government, and the publication of the *Acta Sanctorum* has been continued.

Bologna (böl-lön'ya), one of the oldest, largest, and richest cities of Italy, capital of the province of same name, in a fertile plain at the foot of the Apennines, between the rivers Reno and Savena, surrounded by an unfortified brick wall. It is the see of an archbishop, and has extensive manufactures of silk goods, velvet, artificial flowers, etc. The older quarters are poorly and the modern handsomely built. There are colonnades along the sides of the streets affording shade and shelter to the foot-passengers. Among the principal buildings are the Palazzo Pubblico, which contains some magnificent halls adorned with statues and paintings; the Palazzo del Podestà; and the church or basilica of St. Petronio. Among the hundred other churches, S. Pietro, S. Salvatore, S. Domenico, S. Giovanni in Monte, S. Giacomo Maggiore, all possess rich treasures of art. The leaning towers, Torre Asinelli and Garisenda, dating from the 12th century, are among the most remarkable objects in the city; and the market is adorned with the colossal bronze *Neptune* of Giovanni da Bologna. An arcade of 640 arches leads to the church of Madonna di S. Luca, situated at the foot of the Apennines, near Bologna, and the resort of pilgrims from

all parts of Italy. Bologna has long been renowned for its university, said to have been founded in 1088, and having an attendance of students between 3000 and 5000 in the 12th to the 15th century, and in 1262 nearly 10,000, among them Dante and Petrarch. In 1584 Tasso was a student there, and in the 17th century, Malpighi, the great anatomist, was one of the school's professors. Among its faculty women have several times been numbered. The Academy of Fine Arts has a rich collection of paintings by native artists, such as Francia, and the later Bolognese school, of which the Caracci, Guido Reni, Domenichino, and Albani were the found-



The Asinelli and Garisenda Towers, Bologna.

ers.—Bologna was founded by the Etruscans under the name of *Felsina*; became in 189 B.C. the Roman colony *Bononia*; was taken by the Longobards about 728 A.D.; passed into the hands of the Franks, and was made a free city by Charlemagne. In the 12th and 13th centuries it was one of the most flourishing of the Italian republics; but the feuds between the different parties of the nobles led to its submission to the papal see in 1513. Several attempts were made to throw off the papal yoke, one of which, in 1831, was for a time successful. In 1849 the Austrians obtained possession of it. In 1860 it was annexed to the dominions of King Victor Emmanuel. Pop. 172,628.—The province of BOLOGNA, formerly included in the

papal territories, forms a rich and beautiful tract; area 1450 sq. miles; pop. 527,300.

Bologna, GIOVANNI (prop. *Jean Bologna*), sculptor and architect, born at Douay in 1524, studied at Rome, and passed most of his life at Florence, where he died in 1608. Chief works: a marble *Rape of the Sabines*, and a bronze *Mercury*.

Bologna Phial, or VIAL, a small flask of unannealed glass, which flies into pieces when its surface is scratched by a hard body.

Bologna stone, a name for a variety of heavy spar or sulphate of barium.

Bolometer (bo-lom'e-tér), a most sensitive electrical instrument invented by Langley in 1883 for the measurement of radiant heat.

Bolor-Tagh (bô'lor-tâg), also BIL-AUR, or BELUT TAGH, a mountain range of Central Asia between Eastern and Western Turkestan. It separates the Chinese Empire on the east from the lofty tableland of the Pamir, has a crest line 16,000-20,000 feet high and a peak estimated from 24,400 to 26,000.

Bolsena (bol'sâ-nâ; ancient *Volsinii*, one of the twelve Etruscan cities), a walled town, Italy, province of Rome, on the N. side of a lake of the same name. The district yields a good wine. Pop. (1911) 3286.—The lake (ancient *Lacus Volsiniensis*) is 9 miles long, 7 miles broad, and 1000 feet above sea-level, and is well stocked with fish.

Bolsheviki (bol'she-vê'kê) or BOL-SHEVIKI, otherwise known as the *Maximalists*, a powerful group of the Social Democratic Party of Russia, who took control of affairs at the end of 1917 and concluded a peace treaty with the Quadruple Alliance (Germany, Austria-Hungary, Bulgaria and Turkey), with whom Russia had been at war since August, 1914. The Bolsheviki are the extreme radicals, as opposed to the *Mensheviks*, or *Minimalists*, who are of the moderate school to which Kerensky belonged. Under the Bolshevik government, established in November, 1917, Nikolai Lenine was chosen premier, and Leon Trotzky foreign minister. The Ukrainian peoples in Little Russia refused to recognize the Bolshevik government and seceded, forming a separate republic. See *Russia, Ukrainia, Lenine, Trotzky, Kerensky*.

Bolton (bôl'ton), or BOLTON-LE-MOORS, a large manufacturing town and municipal and parliamentary borough of Lancashire, Eng. It contains some of the largest and finest cotton-mills in the world, the yarns spun being generally

fine, and a great variety of fancy goods being produced, besides plain calicoes; while bleaching is also largely carried on. There are large engineering works, besides collieries, paper-mills, foundries, chemical works, etc. Numerous coal-pits in the vicinity add much to the prosperity of the town. Among the public buildings are one of the finest market-halls in England; a mechanics' institution, a noble building in the Romanesque style; the Chadwick Museum; and a town-hall, in the Grecian style, with a tower 220 feet high, fronting the spacious market-square. The free grammar-school of the town, founded in 1641, has two university exhibitions of £60 a year each. The Bolton Free Public Library, opened in 1853, contains about 50,000 vols. There are several parks and three recreation grounds. Pop. (1911) 180,885.

Bolt-ropes, ropes used to strengthen the sails of a ship, the edges of the sails being sewn to them. Those on the sides are called *leech-ropes*, the others *head- and foot-ropes*.

Bolus (bô'lus), a soft round mass of some medicinal substance larger than a pill, intended to be swallowed at once.

Boma (bô'ma), a trading station on the right bank of the lower Congo, and seat of government of the Congo State.

Bomarsund (bô'mar-sônd), a Russian fortress on the Åland Islands at the entrance of the Gulf of Bothnia, bombarded and forced to capitulate to the allied French and English in 1854 during the Crimean war, and then destroyed.

Bomb (bom), a large, hollow iron ball or shell, filled with explosive material and fired from a mortar. The charge in the bomb is exploded by means of a fuse filled with powder and other inflammable materials, which are ignited by the discharge of the mortar. Conical shells shot from rifled cannon have largely supplanted the older bomb. The use of bombs and mortars is said to have been invented in the middle of the 15th century.

Bomba (bom'ba), a nickname given to Ferdinand II of Naples, on account of his bombardment of Messina in 1848.

Bombard (bom'bârd), a kind of cannon or mortar formerly in use, generally loaded with stone instead of iron balls. Hence the term *bombardier*.

Bombardier (bom-bâr-dêr'), an artillery soldier whose special duties are connected with the loading

and firing of shells, grenades, etc., from mortars or howitzers. See *Bombard*. **Bombardier Beetle**, a name given to beetles of the genera *Brachinus* and *Aptinus*, family Carabidae, because of the remarkable power they possess of being able to defend themselves by expelling from the anus a pungent acrid fluid, which explodes with a slight report on coming in contact with the air.

Bombardment (bom-bard'ment), an attack with bombs or shells upon a fortress, town, or any position held by an enemy. In the bombardment of towns in Belgium during the European war (q. v.) the Germans used great 42-centimeter guns. The bombardment of Paris by the Germans with a long-distance gun placed in the forest of St. Gobain, 75 miles away, in March and April, 1918, was one of the many astounding exploits of the war. Great guns running from eight-inch to fourteen-inch in caliber were used by the Allies to bombard the enemy's depots in the back area.

Bombardon (bom-bâr'dun, a large musical instrument of the trumpet kind, in tone not unlike an ophicleide. Its compass is from F on the fourth ledger-line below the bass-staff to the lower D of the treble-staff. It is not capable of rapid execution.

Bombasin. See *Bombazine*.

Bombax. See *Silk-cotton Tree*.

Bombay (bom-bā'; Portuguese 'good harbor'), the chief seaport on the west coast of India, and capital of the presidency of the same name. It stands at the southern extremity of the island of Bombay, and is divided into two portions, one known as the Fort, and formerly surrounded with fortifications, on a narrow point of land with the harbor on the east side and Back Bay on the west; the other known as the City, a little to the northwest. In the Fort are Bombay Castle, the government offices, and almost all the merchants' warehouses and offices; but most of the European residents live outside of the mercantile and native quarters of the town in villas or bungalows. Bombay has many handsome buildings, both public and private, as the cathedral, the university, the secretariat, the new high court, the post and telegraph offices, etc. Various industries, such as dyeing, tanning, and metalworking, are carried on, and there are large cotton factories. The commerce is very extensive, exports and imports of merchandise reaching a total value of over \$300,000,000 annually. The harbor is one

of the largest and safest in India, and there are commodious docks. There is a large traffic with steam-vessels between Bombay and Great Britain, and regular steam communication with China, Australia, Singapore, Mauritius, etc. The island of Bombay, which is about 11 miles long and 3 miles broad, was formerly liable to be overflowed by the sea, to prevent which substantial walls and embank-



ments have been constructed. The harbor is protected by formidable rock-batteries. After Madras, Bombay is the oldest of the British possessions in the East, having been ceded by the Portuguese in 1661. Pop. 972,892.

Bombay, one of the three presidencies of British India, between lat. 14° and 29° N., and lon. 66° and 77° E. It stretches along the west of the Indian peninsula, and is irregular in its outline and surface, presenting mountainous tracts, low barren hills, valleys, and high tablelands. It is divided into a northern, a central, and a southern division, the Sind division, and the town and island of Bombay. Total area, 188,000 sq. m.; pop. 27,074,570, including the city and territory of Aden in Arabia, 70 sq. miles (pop. 44,079). The native or feudatory states connected with the presidency (the chief being Kathiawar) have an area of 69,045 sq. m. and a pop. of 8,059,298. The Portuguese possessions Goa, Damão,

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and Diu geographically belong to it. Many parts, the valleys in particular, are fertile and highly cultivated; other districts are being gradually developed by the construction of roads and railroads. The southern portions are well supplied with moisture, but great part of Sind is the most arid portion of India. The climate varies, being unhealthy in Bombay, the capital and its vicinity, but at other places, such as Poonah, very favorable to Europeans. In 1896-97-98 the bubonic pestilence broke out and destroyed thousands of the natives. The chief productions of the soil are cotton, rice, millet, wheat, barley, dates, and the cocoa-palm. The manufactures are cotton, silk, leather, etc. The great export is cotton. The administration is in the hands of a governor and council. The chief source of revenue is the land, which is largely held on the ryotwar system.

Bombazine (bom-ba-zēn'), is a mixed tissue of silk and worsted, the first forming the warp and the second the weft. It is fine and light in the make, and may be of any color; it has now gone out of fashion.

Bomb-ketch, a kind of vessel formerly built for the use of mortars at sea in a bombardment. Bomb-ketches were usually of 100 to 150 tons burden, about 70 feet long, and had two masts. They were built very strong to sustain the violent shock produced by the discharge of the mortars, of which they generally carried two.

Bombproof, a military protective structure of such thickness and strength that bombs and shells cannot penetrate it. The stores and magazines in forts and other military erections are covered with earth and masonry and in some cases with thick armor-plate, to resist the fire of the most powerful siege guns and mortars.

Bombshell. See *Shell*.

Bombyx (bom'biks), the genus of moths to which the silk-worm moth (*B. mori*) belongs.

Bona (bō'nā), a seaport and fortified city of Algeria, with manufactures of burnouses, tapestry, and saddles, and a considerable trade. Pop. (1906) 36,004.

Bo'na De'a, an ancient Roman goddess of fertility, described variously as the wife, sister or daughter of Faunus, and worshiped at Rome from the most ancient times, but only by women, even her name being concealed from men. Her sanctuary was

a grotto on Mons Aventinus, but her festival (on May 1) was kept in the house of the consul, no males being permitted to attend, even portraits of men being veiled. The symbol of the goddess was a serpent, indicating her healing powers.

Bonanza (bō-nan'za), a Spanish term signifying 'prosperity,' or 'a fair wind.' It was first applied in the United States to the rich silver mines of Nevada; when a rich vein or pocket was discovered, yielding profitable ore, the mine was said to be in 'bonanza.' The term has come in somewhat common use to indicate successful enterprises generally.

Bona Fides (bō'nā fī'dēs), **BONA FIDE** (Lat. 'good faith,' 'in good faith'), a term derived from the Roman jurists, implying the absence of all fraud or unfair dealing. A *bona fide* traveler in England and Scotland is one who actually travels three miles or more from home on Sunday and is therefore legally entitled to drink at a hotel.

Bonaparte (bō'na-pärt), the French form which the great Napoleon was the first to give to the original Italian name *Buonaparte*, borne by his family in Corsica. As early as the 12th and 13th centuries there were families of this name in Northern Italy, members of which reached some distinction as governors of cities (*podestà*), envoys, etc. But the connection between the Corsican Bonapartes and these Italian families is not clearly established, though probably the former descended from a Genoese branch of the family, which transplanted itself about the beginning of the 16th century to Corsica, an island then under the jurisdiction of Genoa. From that time the Buonapartes ranked as a distinguished patrician family of Ajaccio. About the middle of the 18th century there remained three male representatives of this family at Ajaccio, viz. the archdeacon Luciano Bonaparte, his brother Napoleon, and the nephew of both, Carlo, the father of the Emperor Napoleon I. Carlo or Charles Buonaparte, born 1746, studied law at Pisa University, and on his return to Corsica married Letizia Ramolino. He fought under Paoli for the independence of Corsica, but when further resistance was useless he went over to the side of the French, and was included by Louis XV amongst the 400 Corsican families who were to have rights in France as noble. In 1777 he went to Paris, where he resided for several years, procuring a free admission for his second son Napoleon to the military school of Brienne.

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He died in 1785 at Montpellier. By his marriage with Letizia Ramolino he left eight children: Giuseppe, or Joseph (see below), king of Spain; Napoleon I, emperor of the French (see *Napoleon I*); Lucien (see below), prince of Canino; Maria Anna, afterwards called Elise, princess of Lucca and Piombino, and wife of Prince Bacciocchi (see *Bacciocchi*); Luigi, or Louis (see below), king of Holland; Carlotta, afterwards named Marie Pauline, Princess Borghese (see *Borghese*); Annunciata, afterwards called Caroline, wife of Murat (see *Murat*), king of Naples; and Girolamo, or Jerome (see below), king of Westphalia.

Bonaparte (bō'na pärt), CHARLES JOSEPH, grandson of King Jerome B. and his first wife, Elizabeth Patterson, of Baltimore; born in Baltimore, 1851; was graduated from Harvard Law School, 1874, and from that time practised law in his native city. Prominent reformer. On Board of Indian Commissioners in 1902; chairman of National Civil Service League in 1904; president of National Municipal League in 1905; appointed Secretary of the Navy by President Roosevelt in 1905, and was Attorney-General from December, 1906, to end of administration.

Bonaparte, JEROME, youngest brother of Napoleon I, was born at Ajaccio in 1784, and at an early age entered the French navy as a midshipman. In 1801 he was sent out on an expedition to the West Indies, but the vessel being chased by English cruisers, was obliged to put in to New York. During his sojourn in America Jerome Bonaparte became acquainted with Miss Elizabeth Patterson, the daughter of the president of the Bank of Baltimore, and though still a minor, married her in spite of the protests of the French consul on the 24th December, 1803. The emperor, his brother, whose ambitious schemes were thwarted by this marriage, after an ineffectual application to Pope Pius VII to have it dissolved, issued a decree declaring it to be null and void. After considerable services both in the army and navy, in 1807 he was created King of Westphalia, and married Catherine Sophia, Princess of Würtemberg. His government was not wise or prudent, and his extravagance and his brother's increasing exactions nearly brought the state to financial ruin. The battle of Leipzig put an end to Jerome's reign, and he was obliged to take flight to Paris. He remained faithful to his brother through all the events that followed till the final overthrow at Waterloo. After

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that, under the title of the Comte de Montfort, he resided in different cities of Europe, but in later years chiefly at Florence. After the election of his nephew, Louis Napoleon, to the presidency of the French Republic, in 1848, he became successively governor-general of Les Invalides, a marshal of France, and president of the senate. He died in 1860. From his union with Miss Patterson only one son proceeded, Jerome, who was brought up in America, and married a lady of that country, by whom he had two sons, one serving as an officer in the French army during the Crimean war. The offspring of this marriage was not, however, recognized as legitimate by the French tribunals. Of Jerome Bonaparte's second marriage two children remained, Prince Napoleon Joseph, who assumed the name of Jerome, and the Princess Mathilde. From the marriage of Prince Napoleon, well known by the nickname 'Plon-Plon,' with Clotilde, daughter of King Victor Emmanuel of Italy, were born three children—Victor (born 18th July, 1862), Louis and Marie, the first of whom after the death of Napoleon III's son, the Prince Imperial, was generally recognized by the Bonapartist party as the heir to the traditions of the dynasty. Both had to leave France in 1886, a law being passed expelling pretenders to the French throne and their eldest sons.

Bonaparte, JOSEPH, the eldest brother of Napoleon I, was born in Corsica in 1768, educated in France at the College of Autun, returned to Corsica in 1785, on his father's death, studied law, and, practiced at Bastia, soon being elected councillor of the municipality of Ajaccio. In 1793 he emigrated to Marseilles, and married the daughter of a wealthy banker named Clary. In 1796, with the rise of his brother to fame after the brilliant campaign of Italy, Joseph began a varied diplomatic and military career. At length, in 1806, Napoleon, having himself assumed the imperial title in 1804, made Joseph King of Naples, and two years afterwards transferred him to Madrid as King of Spain. His position here, entirely dependent on the support of French armies, became almost intolerable. He was twice driven from his capital by the approach of hostile armies, and the third time, in 1813, he fled, not to return. After Waterloo he went to the United States, and lived for a time at Bordentown, New Jersey, assuming the title of Count de Survilliers. He subsequently went to England, finally repaired to Italy, and died at Florence in 1844.

Bonaparte, LETIZIA RAMOLINO, the mother of Napoleon I, and, after Napoleon's assumption of the imperial crown, dignified with the title of Madame Mere, was born at Ajaccio in 1750, and was married in 1764 to Charles Buonaparte. She was a woman of much beauty, intellect, and force of character. Left a widow in 1785, she resided in Corsica till her son became first consul, when an establishment was assigned to her at Paris. On the fall of Napoleon she retired to Rome, where she died in 1816.

Bonaparte, LOUIS, second younger brother of the Emperor Napoleon I, and father of Napoleon III, was born in Corsica in 1778. He was educated in the artillery school at Chalons, accompanied Napoleon to Italy and Egypt, and subsequently rose to the rank of brigadier-general. In 1802 he married Hortense Beauharnais, Josephine's daughter, and in 1806 was compelled by his brother to accept, very reluctantly, the Dutch crown. He exerted himself to promote the welfare of his new subjects, and resisted as far as in him lay the tyrannical interference and arbitrary procedure of his brother; but disagreeing with the latter in regard to some measures, he abdicated the throne in 1810 and retired to Grätz under the title of the Count of St. Leu. He died at Leghorn in 1846. He was the author of several works which show considerable literary ability.

Bonaparte, LUCIEN, Prince of Canino, next younger brother of Napoleon I, was born at Ajaccio in 1775. He emigrated to Marseilles in 1793, and having been appointed to a situation in the commissariat at the small town of St. Maximin in Provence, he married the innkeeper's daughter. Here he distinguished himself as a republican orator and politician, and was so active on this side that after Robespierre's fall he was in some danger of suffering as a partisan. His brother's influence, however, operated in his favor, and in 1798 we find him settled in Paris and a member of the newly-elected Council of Five Hundred. Shortly after Napoleon's return from Egypt in 1799 he was elected President of the Council, in which position he contributed greatly to the fall of the Directory and the establishment of his brother's power, on the famous 18th Brumaire (9th Nov.). Next year, as Napoleon began to develop his system of military despotism, Lucien, who still held to his republican principles and candidly expressed his disapproval of his brother's conduct, fell into disfavor and was sent

out of the way as ambassador to Spain. Eventually, when Napoleon had the consulate declared hereditary, Lucien withdrew to Italy, settling finally at Rome, where he devoted himself to the arts and sciences, and lived in apparent indifference to the growth of his brother's power. In vain Napoleon offered him the crown, first of Italy and then of Spain; but he came to France and exerted himself on his brother's behalf, both before and after Waterloo. Returning to Italy, he spent the rest of his life in literary and scientific researches, dying in 1840. Pope Pius VII made him Prince of Canino. He was the author of several works, amongst which are two long poems. His eldest son, Charles Lucien Laurent Bonaparte, born in 1803, achieved a considerable reputation as a naturalist, chiefly in ornithology. He published a continuation of Wilson's *Ornithology*; *Iconografia della Fauna Italica*; *Conspectus Generum Avium*, etc. He died in 1857. Another son, Pierre (1815-81) led an unsettled and disreputable life, and became notorious in 1870 by killing, in his own house at Paris, the journalist Victor Noir, who had brought him a challenge. He got off on the plea of self-defense, but had to leave France.

Bonaparte, NAPOLEON. See *Napoleon*.

Bonassus (bon-as'us), a species of wild ox, the aurochs.

Bonaventure (bō-na-ven-tōr'), St., otherwise John of Fidanza, one of the most renowned scholastic philosophers, was born in 1221 in the Papal States; became in 1243 a Franciscan monk; in 1253 teacher of theology at Paris, where he had studied; in 1256 general of his order, which he ruled with a prudent mixture of gentleness and firmness. In 1273 Gregory X made him a cardinal, and he died in 1274 while papal legate at the Council of Lyons. He was canonized in 1482 by Sixtus IV. His writings are elevated in thought and full of a fine mysticism, a combination which procured him the name of *Doctor Seraphicus*. He wrote on all the philosophical and theological topics of the time with authority, but best, perhaps, on those that touch the heart and imagination. Among his writings are *Itinerarium Mentis in Deum*; *Reductio Artium in Theologiam*; *Centiloquium*; and *Breviloquium*.

Bond, an obligation in writing to pay a sum of money, or to do or not to do some particular thing specified in the bond. The person who gives the bond is called the obligor, the person receiving

the bond is called the obligee. A bond stipulating either to do something wrong in itself or forbidden by law, or to omit the doing of something which is a duty, is void. No person who cannot legally enter into a contract, such as an infant, or a lunatic, can become an obligor, though such a person may become an obligee. No particular form of words is essential to the validity of a bond. A common form of bond is that on which money is lent to some company or corporation, and by which the borrowers are bound to pay the lender a certain rate of interest for the money. Goods liable to customs or excise duties are said to be in bond when they are temporarily placed in vaults or warehouses under a bond by the importer or owner that they will not be removed till the duty is paid on them. Such warehouses are called bonded warehouses (stores, etc.).

Bonded Warehouse a warehouse used for storing bonded goods—goods subject to duty on which duty has not been paid.

Bondu, Bondou (bon'dō), a country of Senegambia, West Africa, the center being in about lat. 14° N. long. 12° 30' W. It has a luxuriant vegetation, magnificent forests, and is in many parts under good culture, producing large crops of cotton, millet, maize, indigo, tobacco, etc. The inhabitants are Foulahs. It is governed by a king, but is now under French control.

Bone (bōn), a hard material constituting the framework of mammalia, birds, fishes, and reptiles, and thus protecting vital organs such as the heart and lungs from external pressure and injury. In the fetus the bones are formed of cartilaginous (gristly) substance, in different points of which earthy matter—phosphates and carbonates of lime—is gradually deposited till at the time of birth the bone is partly formed. After birth the formation of bone continues, and, in the temperate zones, they reach their perfection in men between the ages of twenty and twenty-five. From this age till fifty they change but slightly; after that period they grow thinner, lighter, and more brittle. Bones are densest at the surface, which is covered by a firm membrane called the *periosteum*; the internal parts are more cellular, the spaces being filled with marrow, a fatty tissue, supporting fine blood-vessels. Bone consists of nearly 34 per cent organic material and of 66 per cent inorganic substances, chiefly phosphate, carbonate, and fluoride of lime, and phosphate of magnesium. The organic

material is convertible into gelatin by boiling. It is this which makes bones useful for yielding stock for soup. The inorganic substances may be dissolved out by steeping the bone in dilute hydrochloric acid. Bones, from the quantity of phosphates they contain, make excellent manure. See *Bone Manure*.

Bone-ash, **BONE-EARTH**, the earthy or mineral residue of bones that have been calcined so as to destroy the animal matter and carbon. It is composed chiefly of phosphate of lime, and is used for making cupels in assaying, etc.

Bone-bed, in geology a bed containing numerous fragments of fossil bones, teeth, etc., as in the Rhaetic formation in the southwest of England and the Ludlow bone-bed in the Silurian formation.

Bone Black, **IVORY BLACK**, or **ANIMAL CHARCOAL**, is obtained by heating bones in close retorts till they are reduced to small coarse grains of a black carbonaceous substance. This possesses the valuable property of arresting and absorbing into itself the coloring matter of liquids which are passed through it. Hence it is extensively used in the process of sugar-refining, when cylinders of large dimensions filled with this substance are used as filters. After a certain amount of absorption the charcoal becomes saturated and ceases to act. It has then to be restored by reheating or other methods. Bone-black has also the property of absorbing odors, and may thus serve as a disinfectant of clothing, apartments, etc.

Bone-breccia (brech'i-a), in geology, a conglomerate of fragments of bones and limestone, cemented into a solid mass of rock by calcareous matter, found in certain caverns in Derbyshire, Germany, etc.

Bone-caves, caverns containing deposited in which are embedded large quantities of the bones of animals (many of them extinct), dating from the Pleiocene or later geologic periods.

Bone-dust, bones ground to dust to be used as manure. See *Bone Manure*.

Bone Manure, one of the most important fertilizers in agriculture. The value of bones as manure arises chiefly from the phosphates and nitrogenous organic matters they contain; and where the soil is already rich in phosphates bone is of little use as manure. It is of most service therefore where the soil is deficient in this respect, or in the case of crops whose rapid

growth or small roots do not enable them to extract a sufficient supply of phosphate from the earth, turnips, for instance, or late-sown oats and barley. There are several methods for increasing the value of bones as manure, by boiling out the fat and gelatin, for instance, the removal of which makes the bones more readily acted on by the weather and hastens the decay and distribution of their parts, or by grinding them to dust or dissolving them in sulphuric acid, by which latter course the phosphates are rendered soluble in water. Bones have long been used as manure in some parts of England, but only in a rude, unscientific way. It was in 1814 or 1815 that machinery was first used for crushing them, and bone-dust and dissolved bones are now largely employed as manures. Before being utilized in agriculture they are often boiled for the oil or fat they contain, which is used in the manufacture of soap and lubricants.

Boneset (bōn'set), or **THOROUGHWORT** (*Eupatorium perfoliatum*), a useful annual plant, natural order Compositæ, indigenous to America, and easily recognized by its tall stem, 4 or 5 feet in height, passing through the middle of a large double hairy leaf, and surmounted by a broad flat head of light-purple flowers. It is much used as a domestic medicine in the form of an infusion, having tonic and diaphoretic properties.

Bonfire (bon'fir), a large fire lighted out of doors in celebration of some important or momentous event.

Bonham (bon'am), a town, capital of Fannin Co., Texas, 77 miles N.E. of Dallas. It has cotton gins, oil and flour mills, etc. Pop. 5042.

Bonheur (bo-neur), ROSA, a distinguished French artist and painter of animals, born at Bordeaux 22d March, 1822. When only eighteen years old she exhibited two pictures, *Goats and Sheep* and *Two Rabbits* which gave clear indications of talent. After that time a long list of pictures, *Tillage in Nivernais* (1849), *The Horse Fair* (1853), *Haymaking* (1865), etc., made her name famous. Died May 25, 1899.

Bonifacio (bō-nē-fā'chō), a seaport in Corsica, on the strait of same name, which separates Corsica from Sardinia. Wine and oil are exported, and a coral fishery is carried on. Pop. 3594. The Strait of Bonifacio is 7 miles broad, and contains several small islands.

Boniface (bon'i-fas), the name of nine popes.—**BONIFACE I.** elected 418. He was the first to assume the title

of the First Bishop of Christendom. He died 422.—**BONIFACE II.** elected 530, died in 532. He acknowledged the supremacy of the secular sovereign in a council held at Rome.—**BONIFACE III.** chosen 607, died nine months after his election.—**BONIFACE IV.** elected 608. He converted the Pantheon at Rome into a Christian church.—**BONIFACE V.** 619 to 625. He endeavored to diffuse Christianity among the English.—**BONIFACE VI.** elected 896, died a fortnight after.—**BONIFACE VII.** elected 947, during the lifetime of Benedict VI, and therefore styled antipope. Expelled from Rome in 984, he returned and deposed and put to death Pope John XIV. He died 985.—**BONIFACE VIII** (1294-1303), Benedict Cajetan, one of the ablest and most ambitious of the popes. His idea was, like that of Gregory VII, to raise the papal chair to a sort of universal monarchy in temporal as well as spiritual things. In pursuit of this design he was engaged in incessant quarrels with the German emperors and King Philip of France. He was not, however, very successful. The excommunication which he launched against Philip of France met with no respect, and he was proceeding to lay all France under interdict when he was seized at Anagni by an agent of Philip and a member of the great Colonna family which Boniface had banished from Rome. After three days' captivity the people of Anagni rose and delivered him; but he died a month later, probably from the privations and agitation he had undergone. In 1300 Boniface instituted the jubilees of the church, which, at first centennial, afterwards every twenty-five years, became a great source of revenue to the papal treasury.—**BONIFACE IX** (1389-1404), elected during the schism in the church while Clement VII resided at Avignon. He made a liberal traffic of ecclesiastical offices, dispensations, etc., and lavished the treasures thus procured on his relations or on costly edifices—the fortification of the castle of St. Angelo, for instance, and the Capitol. He died in 1404.

Boniface, St., the apostle of Germany, whose original name was Winfrid, was born in Devonshire in 680, of a noble Anglo-Saxon family. In his thirtieth year he took orders as a priest, and in 718 he went to Rome and was authorized by Gregory II to preach the gospel to the pagans of Germany. His labors were carried on in Thuringia, Bavaria, Friesland, Hesse, and Saxony, through all of which he traveled, baptizing thousands and consecrating churches. He afterwards erected bishoprics and or-

ganized provincial synods. In 723 he was made a bishop, and in 732 an archbishop and primate of all Germany. Many bishoprics of Germany, as Ratisbon, Erfurt, Paderborn, Würzburg, and others, and also the famous abbey of Fulda, owe their foundation to him. He was slain in West Friesland by some barbarians in 755, and was buried in the abbey of Fulda.

Bonin (bō-nēn'), or ARCHBISHOP ISLANDS, several groups of islands, North Pacific Ocean, belonging to Japan, and lying to the south of it. The largest is Peel Island, which is inhabited by some English, Americans, and Sandwich Islanders, who cultivate maize, vegetables, tobacco, and the sugar-cane. It is frequently visited by vessels engaged in whale-fishing, which obtain here water and fresh provisions.

Bonito (bo-nē'tō), a name applied to several fishes of the mackerel family, one of which, the bonito of the tropics, or stripe-bellied tunny (*Thynnus pelámya*), is well known to voyagers from its persistent pursuit of the flying-fish. It is a beautiful fish, steel-blue on the back and sides, silvery on the belly, with four brown longitudinal bands on each side. It is good eating, though rather dry. The *Axius vulgaris* and *Pelámya sarda* also go under this name.

Bonn (bon), an important German town in the Rhenish provinces of Prussia, beautifully situated on the left bank of the Rhine, with magnificent promenades and prospects in the environs. It has some trade and manufactures, but is chiefly important for its famous university founded in 1777 by Elector Maximilian Frederick of Cologne. Enlarged and amply endowed by the King of Prussia in 1818, it is now one of the chief seats of learning in Europe, with a library of more than 300,000 volumes, an anatomical hall, mineralogical and zoological collections, museum of antiquities, a botanical garden, etc. Lange, Niebuhr, Ritschl, Brandis, and other names famous in science or literature are connected with Bonn, and Beethoven was born there. Bonn was long the residence of the Electors of Cologne, and finally passed into the hands of Prussia by the arrangements of the Congress of Vienna in 1815. Pop. (1905) 81,997.

Bonner (bō-nēr), EDMUND, an English prelate, was born about 1495, of obscure parentage. He took a doctor's degree at Oxford in 1525, and, attracting the notice of Cardinal Wolsey, received from him several offices in the church. On the death of Wolsey he acquired the favor of Henry VIII, who

made him one of his chaplains, and sent him to Rome to advocate his divorce from Queen Catharine. In 1540 he was consecrated Bishop of London, but on the death of Henry (1547), having refused to take the oath of supremacy, he was deprived of his see and thrown into prison. He was freed, but again arrested, and died in prison, 1569.

Bonner, ROBERT, American editor and publisher, was born in Londonderry, Ireland, in 1829. An emigrant to the United States at an early age, he settled in Hartford, Connecticut, and later removed to New York. As editor and owner of the *New York Ledger*, a weekly periodical, he attained country-wide fame by the publication of stories and articles by the most noted men then living. Among contributors to the *Ledger* were Longfellow, Beecher, 'Fanny Fern' (Mrs. James Parton), Tennyson, Dickens, Bryant, Sylvanus Cobb and Edward Everett. He died in 1899.

Bon'net, a covering for the head, now especially applied to that worn by women. In England the bonnet was superseded by the hat as a head-dress two or three centuries ago, but continued to be distinctive of Scotland to a late period.

Bonnet-piece, a Scotch coin, so called from the king's head on it being decorated with a bonnet instead of a crown. It was struck by James I. and is dated 1539. Bonnet-pieces are very rare, and highly valued by antiquarians.

Bonnet Rouge (bō-nā-rōzh; 'red cap'), the emblem of liberty during the French Revolution, and then worn as a head-dress by all who wished to mark themselves sufficiently advanced in democratic principles; also called *cap of liberty*.

Bonneval (bon-vál), CLAUDE ALEXANDRE, COUNT, a singular adventurer, born in 1675 of an illustrious French family. In the war of the Spanish Succession he obtained a regiment and distinguished himself by his valor as well as by his excesses. On his return to France he was obliged to fly in consequence of some expressions against the minister and Madame de Maintenon. Received into the service of Prussia, Eugene, he fought against his native country, and, after performing many signal services, was raised in 1716 to the rank of lieutenant field-marshal in Austrian service, and distinguished himself against the Turks at Peterwardein. But his reckless and impatient spirit brought him into conflict with the superior authorities, and he finally took refuge

Constantinople, where he was well received. He now professed conversion to Mohammedanism, submitted to circumcision, received the name of *Achmet*, was made a pasha of three tails, and as general of a division of the army achieved some considerable successes against Russians and Austrians. He died in 1747. The memoirs of his life published under his name are not genuine.

Bonnivard (bon-è-vär), FRANÇOIS DE, was born at Seyssel, France, in 1498. He took the side of the Genevese against the pretensions of the Dukes of Savoy. In 1530 he fell into the hands of the duke, and was imprisoned till 1536 in the castle of Chillon, when the united forces of the Genevese and the Bernese took Chillon. He died at Geneva in 1570. He is the hero of Byron's 'Prisoner of Chillon,' and was the author of *A Chronicle of Geneva*.

Bonpland (bôn-plân), AIMÉ, a distinguished French botanist, born at Rochelle in 1773. While pursuing his studies at Paris he made the acquaintance of Alexander von Humboldt, and agreed to accompany him in his celebrated expedition to the New World. During this expedition he collected upwards of 6000 plants, previously unknown, and on his return to France in 1804 was made director of the gardens at Navarre and Malmaison. On the Restoration he proceeded to South America, and became professor of natural history at Buenos Ayres. Subsequently, while on a scientific expedition up the river Paraná, he was arrested by Dr. Francia, the dictator of Paraguay, as a spy, and detained for eight years. He afterwards settled in Brazil, where he died in 1858.

Bontebok (bon'te-bok), the pied antelope (*Alcelaphus pygarga*), an antelope of S. Africa, with white markings on the face, allied to the blesbok.

Bonus (bô'nus), something given over and above what is required to be given, especially an extra dividend to the shareholders of a joint-stock company, holders of insurance policies, etc., out of accrued profits.

Bony Pike, or GARFISH (*Lepidosteus*), a remarkable genus of fishes inhabiting North American lakes and rivers, and one of the few living forms that now represent the order of ganoid fishes, so largely developed in earlier geological epochs. The body is covered with smooth, enameled scales, so hard that it is impossible to pierce them with a spear. The common garfish (*L. osseus*) attains the length of 5 feet, and is easily distinguished by the great length of its jaws.

Bonze (bons), the name given by Europeans to the priests of the religion of Fo or Buddha in Eastern Asia, particularly in China, Burmah, Tonquin, Cochinchina, and Japan. They do not marry, but live together in monasteries. There are also female bonzes, whose position is analogous to that of nuns in the Roman Catholic Church.

Booby (bô'bi; *Sula fusca*), a swimming bird nearly allied to the gannet, and so named from the extraordinary stupidity with which, as the older voyagers tell, it would allow itself to be knocked on the head without attempting to fly. The booby lives on fish, which it takes, like the gannet, by darting down upon them when swimming near the surface of the water.

Boodha (bôd'a). See *Buddha*.

Book, the general name applied to a printed volume. In early times books were made of the bark of trees; hence the Latin *liber* means bark and book, as in English the words *book* and *beech* may be connected. The materials of ancient books were largely derived from the papyrus, a plant which gave its name to paper. The use of parchment, prepared from skins, next followed, until it was supplanted in Europe by paper in the 12th century, though paper was made in Asia long before this. Recent research has shown that the ancient Babylonians and Assyrians had a large and varied literature, reaching back to 3000 or 4000 years B.C. But they possessed no books in the modern sense, their volumes consisting of clay tablets, on which the text was impressed by wedge-shaped alphabetic stamps. Some of this work is so finely done that it needs a magnifying glass to read it. Such tablets, numbered, served as pages for their literary works. The use of papyrus to write upon began in Egypt, the ancient papyrus book being a long roll, written upon one side, and fastened to a wooden roller, round which it could be wound. Some of these rolls still exist, from more than 20 to even 40 yards long. The trouble of unrolling and reading these led to their being broken up into sections, each on a separate roll, and it was in this way the Greek and Roman papyrus manuscripts were prepared. When the art of paper-making was learned, and even with vellum, or parchment, it proved desirable to replace the rolled with the folded form, sometimes four sheets being folded in the middle and placed within each other, making a pamphlet of eight pages; sometimes five or six sheets being used, making ten or twelve pages. These were known re-

spectively as quaternions, quinternions or quinterns, and sexterns. In collecting a number of these to form a volume, marks are placed upon them to indicate their proper succession, thus leading to the modern custom of signatures on book sheets. When it became usual to print a certain number of pages at once, the paper was not folded and set up until it had passed through the press, the printed pages being so adjusted that they would come in proper succession when folded. For the method in which these sheets are made up into a book, see *Bookbinding*. In this way books have been made differing greatly in size. In addition to those of ordinary dimensions, varying from two to twelve or eighteen foldings, there are giants and dwarfs among books. Thus certain church books in the Escorial are said to be six feet long by four feet wide. The dwarfs have representatives in the 'Thumb-Bible,' not much bigger than a postage stamp; Pickering's Diamond edition of *Tasso*, 3¼ inches long by 1½ inches wide; and an 1878 edition of the *Divina Commedia*, less than 2¼ by 1½ inches in measurement. See *Bibliography*, *Bookbinding*, *Book-trade*, *Printing*, etc.

Book-binding, the art of making up the sheets of a book into a volume with a substantial case or covering. In the middle ages the work of binding the manuscripts then used was done by the monks, in a heavy and very solid style. With the invention of printing, and the consequent multiplication of books, binding became a great mechanical art, in which the Italians of the 15th and 16th centuries took the lead. Later on the French binders enjoyed a well-deserved supremacy for delicate and elegant work. During the 19th century bookbinding continued to rank as a fine art, especially in France, where very fine and elaborate work was done. Artistic work was also done in England, and towards the end of the century the United States and Germany came into this field of art. The now common process of cloth or case binding was introduced in 1822, leather binding preceding it. The latter is performed as follows:—

The first operation in bookbinding is to fold the sheets—into two leaves if the book be folio; if quarto, into four leaves; octavo, eight leaves; and so of all others. After the sheets are folded, they are arranged in the proper order, according to the letters or figures, technically called *signatures*, which are printed at the bottom of the first page of each sheet. The collected sheets are pressed in a screw or hydraulic press for several hours, and the

book being now firm and solid, shallow channels are sawed across the back in several places, in order to admit the cords to which the sheets are to be sewed and the boards fastened. The sewing is done by an ingenious sewing machine, which like nearly all the machinery now employed in bookbinding, is of American invention. The back is then covered with a coating of glue, and when dry rounded with a hammer, and afterward beaten till it projects a little over the boards that compress it, so that a groove is formed for the edges of the boards to rest in. The boards are then laced to the book by the ends of the cords on which the sheets are sewed. The book is then pressed again for several hours, to make it solid for cutting the edges, which is performed by a machine called a *planer* or guillotine. Before the front edge is cut the back is made flat, and after cutting it is again rounded, leaving the face hollow. When the book is cut it may either be gilt, marbled, sprinkled, colored on the edges, or left white. In gilding, the edges are made perfectly smooth, then sized with white of egg mixed with water, and covered with the gold-leaf. After having dried, the gold is burnished with an agate burnisher. Marbling is done by dipping the edges slightly into the coloring mixture as floats on the surface of gum-water. Sprinkling is performed with a brush, which the workman dips in color and shakes in small drops on the edges. After the head-band has been added the book is ready for the leather cover. The cover after being damped with water, and having the rough side smeared with strong paste made of flour, is now pulled out and doubled over the edges of the boards. The sides and edges are then neatly squared and smoothed, and the book is put for some hours into the press, after which it is ready for its ornaments and letters. The letters or ornaments on books are made with brass tools engraved in relief. A book is called *half-bound* or *half leather* when only the back and corners are leather.

The above description applies chiefly to the binding of books in leather, and in the strongest manner; but an immense number of books are now bound entirely in cloth, a style of binding which, though strong, is cheaper and more expeditious, and often very handsome. The covers or 'cases' are made up completely embossed, gilt, and lettered—before being attached to the book, the ornaments being stamped upon them by presses acting on metal dies. The covers are usually attached by thin canvas glued to the back

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Bookkeeping

as well as by the back-cords, or tapes used instead. A simpler method of binding is commonly practised in the case of engravings, atlases, manuscripts, etc., when the volumes are made up of separate leaves instead of sheets. It consists in smearing the back of the book, while placed in the press, with a solution of caoutchouc, by which means each paper edge receives a little of this tenacious substance, and all are firmly kept in their places. Such books open up quite flat at once.

Book-keeping, is the art or method of recording mercantile or pecuniary transactions, so that at any time a person may be able to ascertain the details and the extent of his business. It is divided, according to the general method pursued, into bookkeeping by single or by double entry. Bookkeeping by single entry is comparatively little used, except in retail businesses of small extent, where only the simplest record is required. In its simplest form debts due to the trader are entered in the daybook at the time of the transaction to the debit of the party who owes them; and debts incurred by the trader to the credit of the party who gave the goods. From this book the accounts in a summarized form are transferred to the ledger, where one is opened for each different person, one side being for Dr., and the other for Cr. When a balance-sheet of the debts owing and owned is made, this, together with stock and cash in hand, shows the state of the business.

Bookkeeping by double entry, a system first adopted in the great trading cities of Italy, gives a fuller and more accurate record of the movement of a business, and is necessary in all extensive mercantile concerns. The chief feature of double entry is its system of checks, by which each transaction is twice entered, to the Dr. side of one account and then to the Cr. side of another. An important feature of the system consists in adopting, in addition to the personal accounts of debtors and creditors contained in the ledger, a series of what are called *book-accounts*, which are systematic records in the form of debtor and creditor of particular classes of transactions. For every debt incurred some consideration is received. This consideration is represented under a particular class or name in the ledger, as the debtor in the transaction in which the party from whom the consideration is received is the creditor. Thus A buys goods to the value of \$500 from B. He enters these in his journal—Stock Acct. Dr. \$500 (for goods purchased). To B, \$500. The first \$500 appears in

the Dr. column of the journal, and is posted in the ledger to the debit of Stock Account; the second appears in the Cr. column, and is posted in the ledger to the Cr. of B. In like manner, when the goods are paid, Cash, for which an account is opened in the ledger, is credited with \$500, and B is debited with the same. When the goods are sold (for cash) Stock is credited and Cash is debited. If the amount for which they sell is greater than that for which they were bought, there will be a balance at the debit of Cash and a balance at the credit of Stock. The one balance represents the cash actually on hand (from this transaction), the other the cause of its being on hand. If there is a loss on the transaction, the balance will be on the other side of these accounts. Ultimately the balance thus arising at Dr. or Cr. of Stock is transferred to an account called Profit and Loss, which makes the stock account represent the present value of goods on hand, and the profit and loss account, when complete, the result of the business. In this system the risk of omitting any entry, which is a very common occurrence in single bookkeeping, is reduced to its smallest, as unless a particular transaction is omitted in every step of its history, the system will inexorably require that its whole history should be given to bring the different accounts into harmony with each other.

In keeping books by double entry, the books composing the set may be divided into two classes, called principal and subordinate books. The subordinate books are those in which the transactions are first recorded, and vary both in number and arrangement with the nature of the business and the manner of recording the facts. The most important of these (all of which are not necessarily to be found in the same set) are Stock Book, Cash Book, Bill Book, Invoice Book, Account Sales Book. The principal books are made up exclusively from the subordinate books and classified documents of the business. In the most perfect system of double entry they consist of two, the Journal and Ledger. The journal contains a periodical abstract of all the transactions contained in the subordinate books, or in documents not entered in books, classified into debits and credits. The ledger contains an abstract of all the entries made in journal classified under the heads of their respective accounts. It is an index to the information contained in the journal, and also a complete abstract of the actual state of all accounts, but gives no further information; while the journal gives the reason

of each debit and credit, with a reference to the source where the details of the transaction are to be found.

Books, CENSORSHIP OF, the supervision of books by some authority so as to settle what may be published. After the invention of printing the rapid diffusion of opinions by means of books induced the governments in all countries to assume certain powers of supervision and regulation with regard to printed matter. The popes were the first to institute a regular censorship. By a decree (*De Impressionibus Librorum*) of the Lateran council in 1515, no work was allowed to be printed without previous examination by ecclesiastical authority, the penalty of unlicensed printing being excommunication of the culprit and destruction of the books. In 1557 Pope Paul IV, through the Inquisition at Rome, published the first Roman *Index*, confirming the decree of the Council of Trent in 1546, containing the three classes of prohibited books, viz., authors condemned with all their writings; prohibited books whose authors are known; pernicious books by anonymous authors. In 1564 appeared with papal approval the *Index Librorum Prohibitorum*. The work of correcting the Index to date is in the hands of the 'Congregation of the Index,' which consists of several cardinals and a number of 'consultors' and 'examiners of books.' In England the censorship was established by act of parliament in 1662, but before that both the well-known Star-chamber and the parliament itself had virtually performed the functions. In 1694 the censorship in England ceased entirely. In France the censorship, like so many other institutions, was annihilated by the revolution. During the republic there was no formal censorship, but the supervision of the directory virtually took its place, and at length in 1810 Napoleon openly restored it under another name (*Direction de l'Imprimerie*). After the restoration it underwent various changes, and was re-established by Napoleon III with new penalties. In the old German empire the diet of 1530 instituted a severe superintendence of the press, but in the particular German states the censorship was very differently applied, and in Protestant states especially it has never been difficult for individual authors to obtain exemption. In 1849 the censorial laws were repealed, but were again gradually introduced, and still exist in a modified form. The censorship was abolished in Denmark in 1849, in Sweden in 1809, in the Netherlands in 1815. In Russia and Austria there is a despotic censorship. See *Press, Liberty of the*.

Book Trade, the production and distribution of books com-

mercially. Even in ancient times, before the invention of printing, this trade had attained a high degree of development, at Alexandria and later at Rome, where Horace mentions the brothers Sosii as the chief booksellers of his time. Copies of books were readily multiplied by hand in those times, as we hear of as many as a thousand slaves being employed at one time in writing to dictation. After the fall of Rome down to the 12th century the trade in books was almost entirely confined to the monasteries, and consisted chiefly in the copying of manuscripts and the barter or sale of the copies, generally at a very high price. But with the rise of the universities the trade received new development, and in all universal towns booksellers and book-agents became numerous. The invention of printing had a powerful effect on the trade of book-selling, as was first manifested in the commercial towns and free cities of the German empire. The printers were originally at the same time publishers and booksellers, and they were in the habit of disposing of their books at the chief market-towns and places frequented by pilgrims. It was only in the 16th century that these two branches of trade began generally to be carried on independently.

The two chief departments of the book trade now are publishing and book-selling by retail in all its branches, printing being regarded as a separate business. For the most part these two departments of the trade are carried on separately, but it is not uncommon for them to be united. The publisher of a book is the one who brings it before the public in printed form, often purchasing the copyright, with the condition of publishing the work at his own risk; or the risk (profit or loss) may be shared between the author and publisher. Very frequently books are printed at the cost of the author or some learned society, and published on commission. In order to secure a large sale as possible, the publisher brings himself into connection with the retail booksellers, who are the direct means of distributing the book to the public. Second-hand booksellers belong to a special department of the retail book trade, many of the books they deal in having been long out of print. In Britain the chief seat of the book trade is London, Edinburgh coming next (after a long interval); but publishing is also carried on to a considerable extent in Dublin, Manchester, Glasgow, and some other places. In France the center of the book trade is Paris, where almost all the books appear which make any pretensions

to occupy an important place in literature. The book trade of the United States, the chief seats of which are New York, Philadelphia, Boston, and Chicago, is very large. Canada and Australia are also developing an active business of this kind. The great center of the German book trade is at Leipzig, and the fair held in the latter city at Easter is the occasion on which all the accounts made in the book trade during the past year are settled. The common practice is for the booksellers to receive supplies of new books from the publishers on commission, with liberty to send back to the publisher all the copies that are not sold before the time of settlement at the Easter Fair (Ostermesse), or to carry over a part of them to next year's account if the sale has so far been unsuccessful. All business between the publishers and retail booksellers is carried on indirectly by means of commission agents, especially in Leipzig, but also in Berlin, Vienna, Frankfurt, and other towns. Every bookseller out of Leipzig has his agent there, who conducts all his business, and is in constant communication with the other booksellers. A large number of the publishers deposit with their agents at Leipzig a stock of the works which they have published, and commission them to carry out all orders on their account. The retail bookseller sends all his orders to his agent, who communicates them to the Leipzig publishers and the agent of the other publishers. In Italy there is no central point either for the production of books or for the conduct of the trade by means of agents. Florence, Milan, and Turin hold nearly the same position.

In publishing new books, besides the expense of copyright, paper, presswork, etc., the publisher has to consider the number of presentation copies required for reviews, the percentage off the price allowed to the retail bookseller, in many cases also to the commission agent, and the expenses of advertising and making the work known to the public. The total number of works (including new editions) annually published in Germany reaches now the high total of 30,000; in France 10,000 to 12,000; in the United States and Great Britain it approaches 10,000 each. These figures do not afford a fair comparison, however, in the absence of any agreement as to what constitutes a book, some countries calling publications books which others would call pamphlets.

Bookworm, any insect grub which feeds on books, attracted either by the paper, ink, paste, or the leather of the binding. A considerable

number of insects thus attack books. The name especially belongs to the larva of a species of anobium, a small beetle, and also to the larva of a small moth resembling the anobium. In the United States, though these bookworms are not present, others take their place, especially a small cockroach, the Croton bug (*Beattia Germanis*). The title is applied derisively to men with whom poring over books is the chief interest in life.

Boulac'. See *Boulak*.

Boole (böl), GEORGE, an English mathematician and logician, born in 1815; died in 1864. A native of Lincoln and educated there, he opened a school in his twentieth year, and by private study gained such proficiency in mathematics that in 1849 he was appointed to the mathematical chair in Queen's College, Cork, where the rest of his life was spent. In 1857 the universities of Dublin and Oxford conferred on him the degrees of LL.D. and D.C.L., respectively. In mathematics he wrote on *Differential Equations; General Method in Analysis; The Comparison of Transcendents*, etc. In logic he wrote *An Investigation of the Laws of Thought*, and *The Mathematical Analysis of Logic*, a profound and original work, in which a symbolic language and notation were employed in regard to logical processes.

Bcom (böm), a large pole or spar run out from various parts of a ship or other vessel for the purpose of extending the bottom of particular sails. Also a strong beam, or an iron chain or cable, fastened to spars extended across a river or the mouth of a harbor, to prevent an enemy's ships from passing.

Boom (böm), a town in Belgium, about 10 miles south of Antwerp. It has extensive brickyards, tanneries, etc. Pop. 15,863.

Boomerang (bō'me-rang), a missile instrument used by the Australian aborigines, and by some peoples of India, made of hard wood, about



Boomerangs.

the size of a common reaping-hook, and of a peculiar curved shape, sometimes resembling a rude and very open V. The boomerang, when thrown as if to hit

some object in advance, instead of going directly forward, slowly ascends in the air, whirling round and round to a considerable height, and returns to the position of the thrower. If it hits an object, of course it falls. The Australians are very dexterous with this weapon, and can make it go in almost any direction, sometimes making it rebound before striking.

Boondoe (bōn'de), or BUNDI, a principality of Hindustan, in Rajputana, under British protection; area, 2800 square miles. Although small, Boondoe is important from its position, as a medium of communication between the states. Pop. 171,277. Boondoe, the capital, is picturesquely situated, and its antiquity, numerous temples, and magnificent fountains give it a very interesting appearance. Pop. 20,744.

Boone (bōn), DANIEL, a pioneer of civilization, born in Pennsylvania in 1735; died in 1820. He crossed the Appalachian Mountains in 1769 to explore the little known region of Kentucky, and had many strenuous adventures with the Indians. In 1775 he built a fort on the Kentucky river, where Boonesborough now is, and settled there. In 1778 he was taken prisoner by the Indians, and was retained and adopted into the family of a Shawnee chief, but at length he effected his escape, and reached Boonesborough in time to save it from capture. He surpassed the Indians in their own arts. In the end of the century he removed from Kentucky into Missouri, where he died. From him a number of places in the United States take their names.

Boone, a city, capital of Boone County, Iowa; noted for coal and lumber. There are extensive deposits of potter's clay in its vicinity, and it has machine shops, brick and tile works, etc. Pop. 10,347.

Boorhanpoor'. See *Burhānpur*.

Booro (bō'ru), one of the Molucca Islands in the Indian Archipelago, w. of Ceram and Amboyna, belonging to the Dutch. It is oval in shape, 92 miles long and 70 broad. Though mountainous and thickly covered with wood, it is productive, yielding rice, dyewoods, etc. Pop. 20,000.

Booroojird (bō-rō-jērd'), a town of Persia, province of Irak-ajemi, in a fertile and well-cultivated valley. It has a large trade in skins, etc. Pop. 20,000.

Boossa. See *Boussa*.

Boot (bōt), an article of dress, generally of leather, covering the foot

and extending to a greater or less distance up the leg. Hence the name was given to an instrument of torture made of iron, or a combination of iron and wood, fastened on to the leg, between which and the boot wedges were introduced and driven in by repeated blows of a mallet, with such violence as to crush both muscles and bones. The special object of this form of torture was to extort a confession of guilt from an accused person.

Bootan. See *Bhutan*.

Bootes (bo-ō'tēs; that is, ox-driver), the Greek name of a northern constellation, called also by the Greeks *Arctophylax*. It contains Arcturus, a star of the first magnitude.

Booth (bōth), BALLINGTON, born at Brighouse, England, in 1853, son of William Booth (q. v.). He was commander of the Salvation Army in Australia (1885-87); in the United States (1887-96), and founded in 1888 the volunteers of America, a separate organization of the same character.

Booth, EDWIN THOMAS, an American actor, born at Bel Air, Maryland, in 1833, the son of the distinguished actor Junius Brutus Booth. He made his first appearance at Boston in 1851 and in 1851 he appeared as Richard III at the Chatham Square Theatre in New York, becoming eminent for his impersonation of Shakespearean characters. In 1852 he went West with his father, remaining for several years in California and going to Australia and the Sandwich Islands in 1854. In 1856 he returned to the Eastern States and after a notable southern tour made a great success in Boston and New York as Sir Giles Overreach. In 1860 he married Mary Devlin, who died in 1863. In 1861 he went to London and was extremely successful in the rôle of Richelieu. Returning to New York he acquired control of the Winter Garden and produced Shakespearean plays with marked success. In 1869 he married Mary McVicker who died in 1871. In 1869 he opened a theater of his own in New York, which was badly managed and proved a disastrous failure. In 1871 he founded the Players' Club, to which he gave a sumptuous clubhouse. He died in 1893.—His father, JUNIUS BRUTUS BOOTH, an English tragedian, (born in London in 1796, died in 1852), was an actor of eccentric character but of great ability, especially distinguished in the part of *Richard III*. Most of his life was spent in the United States. The second son, JOHN WILKES BOOTH (1839), also an actor, was the assassin of President Lincoln, April

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Booth

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Booth, WILLIAM, founder and general of the Salvation Army, born at Nottingham, England, April 10, 1829; died August 20, 1912. He was a minister of the Methodist New Connection (1850-61), and began evangelistic work in London in 1865. Under his guidance the Salvation Army, for years the subject of ridicule, became a powerful organization, with branches in every civilized country. See *Salvation Army*.

Booth, WILLIAM BRAMWELL, son of William, born in Halifax, England, March 8, 1850. He was educated privately, and from 1874 on took an important part in the work of the Salvation Army. He was nominated as general by his father, and succeeded the latter upon his death in 1912.

Boothia Felix (bō'thi-a fē'liks), a peninsula of British North America, stretching northwards from the Arctic circle, discovered by Captain Ross in 1830. In the west coast of this country Ross located the north magnetic pole.

Bopp (bop), **FRANZ**, a distinguished German Sanskrit scholar and philologist, born at Mainz, Jan. 1791; died at Berlin in 1867. He contributed much to the study of Sanskrit in Europe, and raised philology to the rank of a science. His most important work in the field was his *Comparative Grammar of Sanskrit, Zend, Greek, Latin, Gothic, old Slavonic, and German*.

Boracic Acid (bō-ras'ik), **BORIC ACID**, a compound of boron with hydrogen and oxygen (H_2BO_3). Boracic acid is found as a saline incrustation in some volcanic regions, is an ingredient in many minerals, and is contained in the steam which, along with sulphurous exhalations, issues from fissures in the soil in Tuscany. The steam from the *fumaroles* here is now an important source of the acid, a system of condensation and evaporation being employed. The acid forms white, shining, acicular crystals, which on heating melt into a transparent mass. The chief use of the acid is as a source of borax, the biborate of sodium. See *Borax*.

Borage (bor'aj; Borāgo), a genus of plants belonging to the natural order Boraginaceæ, having rough, hairy foliage and blue, panicled, drooping flowers, and characterized by mucilaginous and emollient properties. *Borago officinalis*, a common plant, gives a coolness to beverages, and was ranked formerly as one of the cordial flowers.

Boraginaceæ (bor-a-jin-ā'se-ē), the Borage family, a nat-

ural order of regular-flowered monopetalous dicotyledons, with alternate rough leaves, containing a large number of herbs or shrubs chiefly found in the northern temperate regions, among them being borage,alkanet, comfrey, and forget-me-not.

Borassus (bo-ras'us). See *Palmyra Palm*.

Borax (bōr'aks), biborate of sodium ($Na_2B_4O_{10}$). Native borax has long been obtained under the name of *tincal*, from India, the main source being not India but a series of lakes in Tibet. As imported it is in small pieces of a dirty yellowish color, and is covered with a fatty or soapy matter. Tincal, which contains various impurities, was formerly the only source of borax; but besides Tuscany other sources of boracic acid, more particularly in North and South America, and the salt mines at Stassfurt, etc., in Germany, have been rendered available. North America yields large quantities, there being rich deposits of borax and boracic minerals on the Pacific

Pure borax forms large, transparent, six-sided prisms, which dissolve readily in water, effloresce in dry air, and when heated melt in their water of crystallization, swell up, and finally fuse to a transparent glass. Borax has a variety of uses. In medicine it is employed in ulcerations and skin diseases. It has valuable antiseptic and disinfecting properties, and has been used for the preservation of meat, fish, and milk, which practice is reprehensible. It is also employed in soldering metals, and in making fine glaze for porcelain, as it renders the materials more fusible. It is used in enameling, and in making beads, glass, and cement. See *Boracic Acid*.

Borchgrevink (bork'gre-vink), **CADSTEN E.**, Antarctic explorer, born at Christiania, Norway, in 1864. On a whaling voyage in 1894-98 he made observations in the far south, and in Aug., 1898, sailed for the Antarctic seas in command of the *Southern Cross*. The expedition resulted in a sledge journey to 78° 50' south latitude, the farthest south to that date. He also located the south magnetic pole at approximately 72° 40' S. lat. and 152° 30' E. lon.

Borda (bor-dā), **JEAN CHARLES**, a French mathematician and physicist, born at Dax in 1733; died in 1790. He served in the army and navy, and distinguished himself by the introduction of new methods and instruments connected with navigation, geodesy, astronomy, etc., being in particular the inventor of the reflecting circle. He was

Bordeaux

one of the men of science who framed the metric system of weights and measures adopted in France.

Bordeaux (bor-dō), one of the most important cities and ports of France, capital of the dep. of Gironde, on the Garonne, about 70 miles from the sea. It is built in a crescent form round a bend of the river, which is here lined with fine quays and crossed by a magnificent stone bridge, and consists of an old and a new town. The former is chiefly composed of irregular squares and narrow, crooked streets; while the latter is laid out with great regularity, and on a scale of magnificence hardly surpassed

dustry, and there are sugar-refineries, woolen and cotton mills, potteries, saw-works, distilleries, etc. Bordeaux is the *Burdigala* of the Romans. By the marriage of Eleanor, daughter of the Duke of Aquitaine, to Henry II of England, Bordeaux was transferred to the English crown. Under Charles VII. in 1451, it was restored again to France. Montaigne and Montesquieu were born in the neighborhood. Pop. (1915) 261,000.

Bordeaux Mixture (bor-dō'), best known most widely used fungicide, composed of copper sulphate, lime and water, in varying proportions. The original formula



Bordeaux—Quay of Louis XVIII.

by any provincial town in Europe. In the old town are the Cathedral of Saint-André, St. Michael's Church, with its superb front of florid Gothic, the Hôtel de Ville, and the Palais de Justice. There are extensive and finely-planted promenades. Its position gives it admirable facilities for trade, and enables it to rank next aft. - Marseilles and Havre in tonnage. Large vessels sail up to the town, and there is ready communication by railway or river with the Mediterranean, Spain, and the manufacturing centers of France. The chief exports are wine and brandy; sugar and other colonial produce and wood are the chief imports. Shipbuilding is the chief in-

16 lbs. copper sulphate, dissolved in 6 gals. water, and 30 lbs. lime dissolved in 6 gals. water. The two solutions are mixed slowly and thoroughly. This mixture is too strong for some purposes and modified formulas have been substituted.

Bordelais (bōrd-lā), WINES, the name of *vin de Bordeaux* and generally given to the wines made in eleven departments of the south of France, Gironde, Landes, Lot, Garonne, etc., though it is in the south that the most famous are produced. Besides the red wines of the Bordelais, known under the general name of

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SIR ROBERT LAIRD BORDEN, P.C., K.C., M.P.

Borden

there are also white wines, of which the finest growths are Sauterne, Preignac, Barsac, etc.

Borden, ROBERT LAIRD, the Canadian statesman, was born in Grand Pré, Nova Scotia, in 1834. He was admitted to the bar in 1878 and elected a member of the House of Commons for Halifax in 1896. He has taken a leading part in Canadian politics and was chosen leader of the Conservative Opposition upon the resignation of Sir Charles Tupper. He defeated Sir Wilfrid Laurier upon the reciprocity issue and became Prime Minister of Canada in 1911. He received the honor of Knighthood in 1914. Again in 1917 he defeated Sir Wilfrid Laurier in a general election which followed the latter's manifesto declaring for the suspension of the Military Service Act.

Bordentown, a manufacturing town of New Jersey, on the Delaware, 26 miles N. E. of Philadelphia. It contains several advanced educational institutions. Joseph Bonaparte, brother of Napoleon, resided here for some years. Pop. 4250.

Bordone (bor-dō'nā), PARIS, an Italian painter of the Venetian school, born at Treviso in 1500; died at Venice in 1570. He was a pupil of Titian, and was invited to France by Francis I, whose portrait he painted, as also those of the Duke of Guise, the Cardinal of Lorraine, and others. His works are not rare in the public and private collections of Europe, his most famous picture being the *Old Gondolier Presenting a Ring to the Doge*, at Venice.

Bore (bōr), or EAGRE, a sudden influx of the tide into the estuary of a river from the sea, the inflowing water rising to a considerable height and advancing like a wall against the current. The most celebrated bores in the Old World are those of the Ganges, Indus, and Brahmaputra. The last is said to rise to a height of 12 feet. In some rivers in Brazil it rises to the height of 12 to 16 feet. In Britain the bore is observed more especially in the Severn, Trent, Wye, and Solway.

Boreas (bō'rē-as), the name of the north wind as personified by the Greeks and Romans.

Borecole (bōr'kōl), a variety of *Brassica oleracea*, a cabbage with the leaves curled or wrinkled, and having no disposition to form into a hard head.

Borer, a name given to the larvæ of certain insects which bore holes in trees and thus injure them.

Borer



Work of the Bronze Birch Borer, showing Insect and Larva.

Borgerhout (bor'ger-hout), a Belgian town, forming a suburb of Antwerp, with bleaching and dyeing works, and woolen manufactories, etc. Pop. 37,963.

Borghese (bor-gä'ze), a Roman family, originally of Sienna, where it held the highest offices from the middle of the 15th century. Pope Paul V, who belonged to this family, and ascended the papal chair in 1605, loaded his relations with honors and riches. He bestowed, among other gifts, the principality of Sulmone on Marco Antonio Borghese, the son of his brother Giovanni Battista, from whom is descended the present Borghese family.—**BORGHESE, CAMILLO, PRINCE**, was born in 1775; died in 1832. When the French invaded Italy he entered their service, and in 1803 he married Marie Pauline, the sister of Napoleon (born at Ajaccio 1780, died at Florence 1825). In 1806 he was created Duke of Guastalla, and was appointed governor-general of the provinces beyond the Alps. He fixed his court at Turin, and became very popular among the Piedmontese. After the abdication of Napoleon he broke up all connection with the Bonaparte family, and separated from his wife. The *Borghese Palace* at Rome was begun in 1590, and completed by Paul V. It contains one of the richest collections of art in the city. The *Villa Borghese*, a celebrated country-house just outside the Porta del Popolo, Rome, belonging to the Borghese family, also contains a valuable art collection, and the surrounding grounds are very beautiful.

Borgia, CESARE (che'zä-re bor'jä), the natural son of Pope Alexander VI, and of a Roman lady named Vanozza, born in 1478. He was raised to the rank of cardinal in 1492, but afterwards divested himself of the office, and was made Duc de Valentinois by Louis XII. In 1499 he married a daughter of King John of Navarre, and accompanied Louis XII to Italy. He then, at the head of a body of mercenaries, carried on a series of petty wars, made himself master of the Romagna, attempted Bologna and Florence, and had seized Urbino when Alexander VI died, 1503. He was now attacked by a severe disease, at a moment when his whole activity and presence of mind were needed. He found means, indeed, to get the treasures of his father into his possession, and assembled his troops in Rome; but enemies rose against him on all sides, one of the most bitter of whom was the new pope, Julius II. Borgia was arrested and carried to Spain. He at

length made his escape to his brother-in-law, the King of Navarre, and was killed before the castle of Viana, March 12, 1507. He was charged with murder of his elder brother, of the husband of his sister Lucretia, and with free use of the stiletto or secret poison against those who stood in his way. With all his reputed crimes he was patron of art and literature.

Borgia, LUCRETIA, daughter of Pope Alexander VI, and sister of Cesare Borgia. In 1493 she was married to Giovanni Sforza, lord of Pesaro, but after she had lived with him for two years, Alexander dissolved the marriage and gave her to Alphonso, nephew of Alphonso II of Naples. Two years after this new husband was assassinated by the hired ruffians of Cesare Borgia. Her third husband was Alphonso d'Este, son of the Duke of Ferrara. She was accused by contemporaries of incest, poisoning, and almost every species of enormous crime; but several modern writers defend her, maintaining that the charges which have been made against her are false or much exaggerated. She was a patroness of art and literature. Born in 1480, she died in 1519.

Borgo (bor'gö), Ital. for 'town' or 'castle,' occurs as part of the names of many places in Italy. One of the most important is *Borgo San Donnino*, a cathedral city of Parma, with pop. of 6346.

Bor'gu (bor-gö'), a district of Africa in the Western Sudan, lying about lat. 10° N., and stretching from the meridian of Greenwich east to the Niger. Klama and Wawa are chief towns.

Boring, the process of perforating wood, iron, rocks, or other hard substances by means of instruments adapted to the purpose. For boring wood the tools used are *awls*, *gimlets*, *augers*, and *bits* of various kinds, the latter being applied by means of a cross-shaped instrument called a *brace*, or by a lathe, transverse handle, or drill machine. Boring in metal is done by *drills* or *boring bars* revolved by hand machines. Boring in the earth or for mining, geologic, or engineering purposes is effected by means of augers, drills, or jumpers, sometimes worked by hand, but now usually by machines driven by steam or frequently by compressed air. In ordinary mining practice a bore-hole is usually commenced by digging a small pit about 6 feet deep over which is set up a shear-legs and pulley, etc. The boring rods are from 10 to 20 feet in length, capable of being jointed together by box and screw.

Boring

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having a chisel inserted at the lower end. A lever is employed to raise the bore-rod, to which a slight twisting motion is given at each stroke, when the rock at the bottom of the hole is broken by the repeated percussion of the cutting tool. Various methods are employed to clear out the triturated rock. The work is much quickened by the substitution of steam-power, water-power, or even horse-power for manual labor. Of the many forms of boring machines now in use may be mentioned the diamond boring machine, invented by Leschot, a Swiss engineer. In this the cutting-tool is of a tubular form, and receives a uniform rotatory motion, the result being the production of a cylindrical core from the rock of the same size as the bore or caliber of the tube. The boring bit is a steel thimble, about 4 inches in length, having two rows of Brazilian black diamonds firmly embedded therein, the edges projecting slightly. The diamond teeth are the only parts which come in contact with the rock, and their hardness is such that an enormous length can be bored with but little appreciable wear.

Borissoglebsk (bo-ré-so-glepsk'), a town of Russia, gov. Tambov; a place of active trade. Pop. 22,370.

Borissov (bo-ré'sov), a Russian town, gov. Minsk. Not far from it took place the disastrous passage of the Berezina by the French in 1812. Pop. 14,931.

Borkum (bör-kum), a flat sandy island in the North Sea, near the coast of Hanover, off the estuary of the Ems, belonging to Prussia, a favorite resort for sea-bathing. The town of Borkum had a pop. in 1900 of 2114.

Borlase (bör'las), WILLIAM, an English writer, born in Cornwall in 1695; died in 1772. He studied at Oxford, entered into orders, and became successively rector of Ludgvan and vicar of St. Just. In 1754 he published *Antiquities of Cornwall*, and in 1758 *Natural History of Cornwall*.

Bormio (bor'me-o), a small town of N. Italy, prov. Sondrio, with celebrated warm mineral springs. Pop. about 2000.

Born, BERTRAND DE, a French troubadour and warrior, born about the middle of the 12th century in the castle of Born, Périgord; died about 1200. He dispossessed his brother of his estate, whose part was taken by Richard Cœur de Lion in revenge for De Born's satirical lays. Dante places him in the *Inferno* on account of his verses intensify-

ing the quarrel between Henry II and his sons.

Borna (bor'na), an old town of Germany, in Saxony, 15 miles S. E. of Leipzig, with some manufactures. Pop. (1905) 9176.

Borneo (bor'ne-ō, corrupted from *Bruni* or *Brunei*, the name of a state on its northwest coast), one of the islands of the Malay Archipelago, and the third largest in the world. It is nearly bisected by the equator, and extends from about 7° N. to 4° S. lat., and from 109° to 119° E. lon.; greatest length 780, greatest breadth, 690 miles; area about 290,000 sq. miles. It is not yet well known, though our knowledge of it has been greatly increased in recent years. There are several chains of mountains ramifying through the interior, the culminating summit (13,698 ft.) being Kini-Balu, near the northern extremity. The rivers are very numerous, and several of them are navigable for a considerable distance by large vessels. There are a few small lakes. Borneo contains immense forests of teak and other trees, besides producing various dye-woods, camphor, rattans and other canes, gutta-percha and India rubber, honey and wax, etc. Its fauna comprise the elephant, rhinoceros, tapir, leopard, buffalo, deer, monkeys (including the orang-outang), and a great variety of birds. The mineral productions consist of gold, antimony, iron, tin, quicksilver, zinc, and coal, besides diamonds. Only portions of the land in the coastal region are well cultivated. Among cultivated products are sago, gambier, pepper, rice, tobacco, etc. Edible birds'-nests and trepang are important articles of trade. The climate is not considered unhealthy. The population is estimated at about 1,700,000, comprising Dyaks (the majority of the inhabitants), Malays, Chinese, and Bugis. The southwestern, southern, and eastern portions of the island are possessed by the Dutch, under whom are a number of semi-independent princes. On the N. W. coast is the Malay kingdom of Borneo or Bruni. Its chief town is Bruni, on the river of the same name, a place of considerable trade, and the residence of the sultan. Since 1841 there has been a state under English rule (though not under the British crown) on the W. coast of the island, namely, Sarawak (which see), founded by Sir James Brooke, while Labuan, an island off the N. W. coast, is a British colony. In 1881 an English commercial company, with a charter from the British government, acquired sovereign rights

Borneo

over the northern portion of the island, extending northwards from about lat. $5^{\circ} 6'$ N. on the west, and lat. $4^{\circ} 5'$ on the east, and including some adjacent islands. British North Borneo has an area of about 31,000 sq. miles (slightly greater than Scotland), several splendid harbors, a fertile soil, and a good climate. At present the population is sparse, and a large part of the territory consists of virgin forests. The soil is believed to be well adapted for coffee, sago, tapioca, sugar, tobacco, cotton, etc. Probably there are valuable mineral deposits also, gold having been already found. The chief settlement is Sandakan, the capital, on Sandakan Bay. The government is similar to that of British colonies. The revenue is from customs and excise dues, licences, etc. Birds'-nests, rattans, gutta-percha, timber, etc., are exported, the trade being chiefly with Singapore and Hong Kong. Pop. estimated at 200,000.

Bornholm (born'holm), a Danish island in the Baltic Sea, 24 miles long and 16 broad; pop. 40,889. It is rather rocky, and better suited for pasture than tillage. The people are chiefly engaged in agriculture and fishing; pottery ware and clocks are made. Rönne is the chief town.

Bornu (bör-nö'), a negro kingdom of the Central Sudan, on the W. side of Lake Chad, with an area of about 50,000 sq. miles, and a pop. estimated at 5,000,000. It is a pleasant and fruitful land, intersected by streams that enter Lake Chad, and presents a remarkable example of negro civilization, having a well-organized administration, a court and government, with all its dignities and offices. The people practise agriculture and also various arts and manufactures. They are Mohammedans. The *Shehu*, or sultan, has an army of 30,000 men, many armed with firearms. Kuka, former capital (pop. 60,000), near the western shore of Lake Chad, is one of the greatest markets in Central Africa, a large trade being done in horses, the breed of which is famed throughout the Sudan. Another large town, on the shore of the lake, is Ngornu. Since January, 1900, the greater part of this state has been absorbed by British Nigeria.

Boro Budor, the ruin of a splendid Buddhist temple in Java, situated near the Praga River, 15 m. N. W. of Jokjokarta. It is a pyramid, each side measuring 600 feet at the base; and supposed to belong to the 7th century of our era.

Borodino (bor-o-dē'nō), BATTLE OF (called also *battle of the*

Moskwa), a sanguinary battle fought near a village of this name on the river Moskwa, 7th September, 1812, between the French under Napoleon and the Russians under Kutusoff. Each party claimed the victory. At the end of the day the Russians retreated in good order, no pursuit taking place. The French force amounted to about 150,000 men, the Russian was somewhat less; 50,000 dead and dying covered the field.

Boroglyceride (bo-ro-glīs'er-id), a compound of boric acid with glycerin, represented by formula $C_3H_5BO_3$. It is a powerful antiseptic, and being nearly harmless is useful in surgery and medical practice.

Boron (bō'ron, symbol B, atomic weight 11), the element from which all boracic compounds are derived. It is a dark-brown or green amorphous powder, which stains the skin, has a taste or odor, and is only slightly soluble in water. It also crystallizes into diamond-like, brilliant crystals nearly as hard as diamond, which, in the form of dust, is used for polishing. It is one of the elements which combine directly with nitrogen.

Borough (bur'ō), originally a fortified town. In England, a corporate town or township; a town with properly organized municipal government. If it sends a representative to parliament it is a *parliamentary borough*; if not, it is a *municipal borough*. The qualifications for voters in both classes of boroughs are the same. In all boroughs a mayor is chosen annually, and a certain number of aldermen and councilors periodically the burgesses or voters electing councilors, and the councilors elect the mayor and aldermen. Mayor, aldermen, and councilors form the corporation. In the United States, an incorporated town or village in some states.

Borovitchi (bo-ro-vich'ē), a Russian town, gov. of Novgorod, situated on the river Msta in lat. 20° N., lon. 33° E. A market-town. Pop. 9421.

Borovsk (bo-rovsk'), a Russian town, gov. Kaluga, with a large trade. Pop. 8407.

Borromeo Islands (bor-o-mā'ē), four islands in Lago Maggiore, Italy, taking their name from the family of Borromeo. Vitelliano Borromeo in 1671 converted garden soil to be spread over them, converted them from barren rocks into gardens. Isola Bella, the most celebrated of the group, contains a handsome

ace, with gardens laid out upon terraces rising above each other.

Borromeo (bor-o-mā'ō), CARLO, COUNT, a celebrated Roman Catholic saint and cardinal, born in 1538, at Arona, on Lago Maggiore, died at Milan in 1584. In 1560 he was successively appointed by his uncle Pius IV apostolical protonotary, cardinal, and later Archbishop of Milan. The reopening and the results of the Council of Trent, so advantageous to the papal authority, were chiefly effected by the great influence of Borromeo, which was felt during the whole sitting of the council. He improved the discipline of the clergy, founded schools, libraries, hospitals, and was indefatigable in doing good. Immediately after his death miracles were said to be wrought at his tomb, and his canonization took place in 1610.—His nephew, COUNT FEDERIGO BORROMEO, also cardinal and Archbishop of Milan, equally distinguished for the sanctity of his life and the benevolence of his character, was born at Milan in 1564; and died in 1631. He is celebrated as the founder of the Ambrosian Library (which see).

Borrow (bor'ō), GEORGE, an English writer, born 1803; died 1881. He had a passion for foreign tongues, stirring scenes, and feats of bodily prowess. He associated much with the gypsies, and acquired an exact knowledge of their language, manners, and customs. As agent of the British and Foreign Bible Society he traveled in France, Germany, Russia, and the East; spent five years in Spain, and published *The Gypsies in Spain* (1841), and *The Bible in Spain* (1842), the best known of his works. Other works are *Lavengro*, largely autobiographical (1850), *The Romany Rye* (1857), *Wild Wales* (1862), and *Dictionary of the Gypsy Language* (1874).

Borrowdale (bor'ō-dāl), a beautiful valley in the lake district of England, in Cumberland, at the head of the Derwent.

Borrowstounness (bor'ō-stoun-nēs'; popularly Bo'-ness'), a town in Linlithgowshire, Scotland, with good docks, and a large trade in coal, iron, timber, etc. The wall of Antoninus ran through the parish of Borrowstounness, and traces of it, called Graham's Dyke, are still visible. Pop. 9100.

Bor'sad, a town of India, Bombay Presidency, about midway between Baroda and Amedabad, and distant from each about 40 miles. Pop. 12,228.

Borsippa (bor-sip'a), a very ancient city of Babylonia, the site of which is marked by the ruins known as Birs Nimrud.

Bory de Saint Vincent (bo-rē dé sap vāp-sāp), JEAN BAPTISTE GEORGE MARIE, a French naturalist, born in 1780; died in 1846. About 1800-2 he visited the Canaries, Mauritius, and other African islands. He afterwards served for a time in the army, and conducted scientific expeditions to Greece and to Algiers. Chief works, *Annales des Sciences Physiques* (8 vols.), *Voyage dans les Quatre Principales Îles des Mers d'Afrique*; *Expedition Scientifique de Morée*; *L'Homme, Essai Zoologique sur le Genre Humain*.

Boryslaw (bor'i-slav), a town of Austria, in Galicia. Ozokerite and petroleum are here obtained. Pop. 10,671.

Borysthenes (bo-ris'the-nēs), the ancient name of the Dnieper River in Europe.

Bosa (bō'za), a seaport, west coast of Sardinia, in an unhealthy district, with a cathedral and a theological seminary. Pop. 6846.

Boscan-Almogaver (bos-kān'al-mo-ga-vā'r'), JUAN, a Spanish poet, born towards the close of the 15th century; died about 1540. He was the creator of the Spanish sonnet, and, in general, distinguished himself by introducing Italian forms into Spanish poetry.

Boscawen (bos'ka-wen), EDWARD, a British admiral, son of the first Viscount Falmouth, was born in 1711; died in 1761. He distinguished himself at Porto Bello and Cartagena, and in 1747 took part, under Anson, in the battle of Cape Finisterre. His chief exploit was a great victory in 1759 over the Toulon fleet, near the entrance of the Straits of Gibraltar.

Boschbok (bosh'bok), the bushbuck, a name given to several African species of antelope. See *Bushbuck*.

Boschvark (bosh'värk), the bushhog or bushpig of Africa (*Potamocharus Africanus*), one of the swine family, about 5 feet long, and with very large and strong tusks. The Kaffirs esteem its flesh as a luxury, and its tusks, arranged on a piece of string and tied round the neck, are considered great ornaments.

Bos'cobel (bos'kō-bel), a locality in Shropshire, remarkable historically as the hiding place of Charles II for some days after the

battle of Worcester, Sept. 3, 1651. At one time he was compelled to conceal himself among the branches of an oak in Boscobel Wood, where it is related that he could actually see the men who were in pursuit of him and hear their voices. The 'royal oak,' which now stands at Boscobel, is said to have grown from an acorn of this very tree.

Boscovich (bos'ko-vich), ROGER JOSEPH, an astronomer and geometer, born at Ragusa in 1711; died at Milan in 1787. He was educated among the Jesuits, and entered into their order. He was employed by Pope Benedict XIV in various undertakings, and in 1750-53 measured a degree of the meridian in the Ecclesiastical States. He afterwards became mathematical professor in the University of Pavia, whence, in 1770, he removed to Milan, and there erected the celebrated observatory at the College of Brera.

Bosio (bô'se-o), FRANÇOIS JOSEPH, BABON, sculptor, born at Monaco in 1769; died at Paris in 1845. He was much employed by Napoleon and by the successive Bourbon and Orleans dynasties. His works are well known in France and Italy.

Bosna-Serai, or SERAJEVO (boz'na-se'-ri, se-ri-yâ'vô), the capital of Bosnia, situated on the Miljacka, 570 miles W. N. W. of Constantinople. It contains a *serai* or palace, built by Mohammed II, to which the city owes its name. It was formerly surrounded with walls, but its only defense now is a citadel, built on a rocky height at a short distance east from the town. Bosna-Serai is the chief mart in the province, the center of the commercial relations between Turkey, Dalmatia, Croatia, and South Germany, and has, in consequence, a considerable trade, with various manufactures. Pop. (1910) 51,949.

Bosnia (boz'ni-a), a former Turkish province in the northwest of the Balkan Peninsula, adjudged by the Treaty of Berlin (1878) to be administered for an undefined future period by the Austrian government; area (including Herzegovina and Novi-bazar), 19,700 square miles (of which Bosnia proper occupies 16,000), with (1901) 1,591,036 inhabitants, mostly of Slavonian origin and speaking the Serbian language. Of these, all but about one-seventh belonged to Bosnia. They are partly Mohammedans, partly Roman and Greek Catholics. The country is level towards the north, in the south mountainous. Its chief rivers are the Save, the Vrbas, the Bosnia, Unac, and Drina. About half the area is covered with forests.

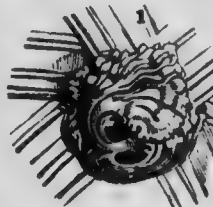
Tillage is carried on in the valleys and low grounds; maize, wheat, barley, buckwheat, hemp, tobacco, etc., are grown. Fruits are produced in abundance. Sheep, goats, and swine are numerous. The minerals include coal, which is worked in several places, manganese, antimony, iron, etc. Among the manufactures are iron goods, arms, leather, linens and woollens. Bosnia had been subject to Turkey from the beginning of the 15th century till 1875, when the insurrection of the inhabitants led to the Russo-Turkish war of 1877-78. It was annexed, with Herzegovina, by Austria Oct. 6, 1908. This annexation was directly responsible for the great European war which began in August, 1914.

Bosporus (bos'po-rus), or BOSPHORUS, the strait, 19 miles long, joining the Black Sea with the Sea of Marmora, called also the Straits of Constantinople. It is defended by a series of strong forts; and by agreement of the European powers no ship of war belonging to any nation can pass Bosporus without the permission of Turkey. Over this channel (about 3000 feet wide) Darius constructed a bridge for his Scythian expedition. (See *Constantinople*.) The Cimmerian Bosphorus was the name given by the ancients to the strait that leads from the Black Sea into the Sea of Azov. There was also anciently a kingdom of the name of Bosporus, so called from this strait on both sides of which it was situated.

Boss, in architecture, an ornament placed at the intersection of ribs or groins in vaulted or flat roofs; it is frequently richly sculptured with armorial bearings or other devices.

Boss Rule, a political term used to signify the management of federal or local government affairs for personal ends.

Bossuet (bos-ü-ä), JACQUES BÉNIGNE, an illustrious French preacher and theologian, was born in 1627 and died in 1704. In 1652 he was ordained priest, and made a canon of Metz, where his piety, acquirements, and eloquence gained him a great reputation. In 1661 he was appointed preceptor to the Dauphin, and in 1681 he was raised to the see of Meaux. He drew up famous propositions adopted by the assembly of French clergy, which secured



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the freedom of the Gallican church against the aggressions of the pope. In his latter years he opposed quietism, and prosecuted Madame Guyon; and when his friend Fénelon defended her he caused him to be exiled. He was unrivaled as a pulpit orator, and greatly distinguished for his strength and acumen as a controversialist. The great occupation of his life was controversy with the Protestants.

is 234 miles N. E. of New York. It has a capacious harbor, covering 75 sq. miles, protected from storms by a great number of islands, on several of which are fortifications. The scenery is varied and picturesque, the site partly consisting of peninsulas and East Boston being on an island. The streets are mostly narrow and irregular in the older parts of the town, but in the newer parts there are many fine, spacious streets. There has



View in the Bosphorus.

Bostan'ji (Turk., from *bostan*, a garden), a class of men in Turkey, originally the sultan's gardeners, but now also employed in several ways about his person, as mounting guard at the seraglio, rowing his barge, etc., and likewise in attend'g the officers of the royal household.

Boston (bos'tun), a borough and seaport of England, in Lincolnshire, on the Witham, about 5 miles from the sea. The name stands for Botolph's town, St. Botolph having founded a monastery here about the year 650. The trade is increasing through the improvement of the accommodation for shipping. The town contains some fine buildings, the parish church being a very large and handsome Gothic structure, with a tower nearly 300 feet high. Ropes, sails, agricultural implements, etc., are made. Pop. (1911) 16,679.

Boston, the capital of Massachusetts and the largest city in New England, lies on Massachusetts Bay, at the mouth of Charles River. By rail it

been developed a splendid system of parks and connecting boulevards, containing 2308 acres of picturesque territory, with ponds, streams, drives and walks, the whole costing over \$16,000,000. Among the principal buildings are the state-house; the county courthouse; the post-office; Faneuil Hall (from Peter Faneuil who presented it to the city in 1742), famous historically as the meeting place of the revolutionary patriots; the city hall or old statehouse, now used as public offices; the splendid granite custom house, of Grecian architecture; public halls, theaters, etc. Harvard University, situated at Cambridge, which may be regarded as a Boston suburb, was founded in 1638. It has a large and very valuable library. The medical branch of this institution is in Boston. The Boston Athenæum has two large buildings—one containing a library, and the other a picture gallery, a hall for public lectures, and other rooms for scientific purposes. Boston University, founded principally by Isaac Rich, and incorporated in 1869, consists of the

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height when the Stamp Act was repealed, the Tea Act being defied by the throwing of three cargoes of tea into the harbor. Here the battle of Bunker Hill was fought, June 17, 1775. Pop. 670,585. In addition are a number of populous suburbs, some of them closely connecting with the city, there being about thirty cities and towns within a radius of ten miles of the statehouse. If these were incorporated into what is often called greater Boston, its population would considerably exceed a million. In this region is an outer park system of 9276 acres of forest, seashore and river bank, with 12 miles of boulevard.

Boston, THOMAS a Scottish divine, born at Dunse in 1677; died in 1732. He was educated at Edinburgh University received license to



servatory of Music is one of the largest in the country. A prominent feature in Boston is the number of good libraries. Besides those connected with the universities is the Public Library, occupying a magnificent building and containing more than 1,000,000 volumes, the State Library and others. Boston carries on an extensive home and foreign trade, and is also largely engaged in the fisheries. It is an important steamship and railroad center, numerous lines converging on the city, and to relieve the congestion of street travel an elevated railway and an intricate system of subways have been constructed. Many manufactures are carried on, one of the principal being that of boots and shoes. The first American newspaper was set up here in 1704. The book trade of the city is important, and some of the periodicals are extensively circulated. Boston was founded in 1630 by English emigrants, and received its name from Boston in Lincolnshire, whence several of the settlers had come. Notwithstanding its increasing size and importance, the affairs of Boston for nearly two hundred years were administered by the townspeople assembled in

preach in 1697, and in 1707 was appointed to the parish of Ettrick in Selkirkshire, where he remained all his life. Besides engaging hotly in the ecclesiastical controversies of his time, Boston published a volume of sermons, several theological treatises, and his two well-known works, *The Crook in the Lot* and *Human Nature in its Fourfold State*.

Boswell (boz'wel), JAMES, the friend and biographer of Dr. Johnson, was the eldest son of Lord Auchinleck, one of the supreme judges of Scotland. He was born at Edinburgh in 1740, and died at London in 1795. He was educated at Edinburgh and Cambridge, became a member of the Scottish bar, but never devoted himself with earnestness to his profession. In 1763 he became acquainted with Johnson—a circumstance which he himself calls the most important event of his life. He afterwards visited Voltaire at Ferney, Rousseau at Neuchâtel, and Paoli in Corsica, with whom he became intimate. In 1768, when Corsica attracted so much attention, he published his account of Corsica, with *Memoirs of Paoli*. In 1785 he settled at London, and was called to the

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English bar. Being on terms of the closest intimacy with Johnson, he at all times diligently noted and recorded his sayings, opinions, and actions, for future use in his contemplated biography. In 1773 he accompanied him on a tour to the Scottish Highlands and the Hebrides, and he published an account of the excursion after their return. His *Life of Samuel Johnson*, one of the best pieces of biography in the language, was published in 1791. His son ALEXANDER, born in 1745, created a baronet in 1821, killed in a duel in 1822, excelled as a writer of Scotch humorous songs, and was also a literary antiquary of no inconsiderable erudition.

Boswellia (bos-wel'i-a), a genus of balsamic plants belonging to the myrrh family (Amyridaceæ), several species of which furnish the frankincense of commerce, more generally known as olibanum. Indian olibanum is got from *Boswellia thurifera*, a large timber tree found in the mountainous parts of India.

Bosworth (bos'wuth), a small town in the county of Leicester, England, about 8 miles from which is Bosworth Field, where was fought, in 1485, the battle between Richard III and Henry VII. This battle, in which Richard lost his life, put a period to the Wars of the Roses. Bosworth gives name to a parl. div. of the county.

Bosworth, JOSEPH, an English philologist, born in Derbyshire in 1790; died in 1876. He was ordained deacon in 1814, and after filling several livings in England was British chaplain at Amsterdam and Rotterdam for twelve years. He devoted much time to researches in Anglo-Saxon and its cognate dialects, the result of his studies appearing from time to time. His chief works are his *Anglo-Saxon Grammar*; *Dictionary of the Anglo-Saxon Language*; and *Compendious Anglo-Saxon and English Dictionary*. In 1857 he was presented to the rectory of Water Shelford, Buckingham, and next year was appointed Rawlinson Professor of Anglo-Saxon at Oxford. In 1867 he gave \$50,000 to establish a professorship of Anglo-Saxon at Cambridge.

Bot, BOTT. See *Battfy*.

Botan'ic Gardens, establishments in from all climates are cultivated for the purpose of illustrating the science of botany, and also for introducing and diffusing useful or beautiful plants from all parts of the world. Until modern times their sole design was the cultivation of medicinal plants. In America the

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principal botanic gardens are those of New York, Philadelphia, Washington, and Cambridge. In Britain the chief botanic gardens are those of Kew (which see), Edinburgh, and Dublin. On the European continent the chief are the *Jardin des Plantes* at Paris, founded in 1634; and those of Berlin, Copenhagen, Florence, etc.

Botany (bot'a-ni; Gr. *botanê*, herb, plant), or **PHYTOLOGY** (Gr. *phyton*, plant, and *logos* discourse), is the science which treats of the vegetable kingdom.

Plants may be studied from several different points of view. The consideration of their general form and structure, and the comparison of these in the various groups from the lowest to the highest, constitutes vegetable *morphology*. *Anatomy* and *histology* treat respectively of the bulkier and the more minute internal structure of the parts, and *physiology* of their functions. *Systematic botany* considers the arrangement of plants in groups and subgroups according to the greater or less degree of resemblance between them. *Geographical botany* tells of their distribution on the earth's surface, and strives to account for the facts observed, while *palæobotany* bears the same relation to distribution in the successive geological strata which make up the earth's crust. *Economic botany* comprises the study of the products of the vegetable kingdom as regards their use to man.

The simplest plants are very minute, and can only be studied by use of the compound microscope. A little rain-water which has been standing some time when thus examined is found to contain a number of roundish green objects, each of which is an individual plant, consisting of one cell only, with an external limiting membrane or cell-wall of a substance known as *cellulose*, within which is granular, viscid *protoplasm*. The protoplasm is permeated by a green coloring matter, *chlorophyll*, and embedded in it is an oval, more solid-looking body, the nucleus. *Protococcus*, as this little plant is called, though so simple, is yet able, by virtue of the living protoplasm, to take up food from the water around it; to digest that food and form more cellulose and protoplasm so as to increase in size; and, finally, to produce new individuals, more *Protococci*. If we imagine *Protococcus* to elongate considerably and be repeatedly divided across by cell-walls, we get a row or filament of cells, a very common form among the low orders of plants; the masses of green threads seen floating in ditches in the

spring and summer consist of such a filamentous plant called *Spirogyra*. Or we may have a single flat sheet of cells, as in the delicate green seaweed *Ulva*. Increased complexity of structure is exemplified in many of the ordinary seaweeds, the stalk and more or less flattened expansions of which are several to many cells thick, the external cell-layers differing somewhat in structure from the internal. But we cannot distinguish in any of these between a stem, leaf, or root, as we can, for instance, in the more highly differentiated fern. Plants in which such a distinction cannot be drawn are called *Thallophytes*, and their whole body a *thallus*. Thallophytes can be divided into two classes: *Algae* and *Fungi*. The former are distinguished by the presence of the green coloring matter chlorophyll, which is of vital importance in the physiology of the plant; sometimes the green color is obscured by the presence of a brown or red compound, as in the brown and red seaweed. The *Fungi* contain no chlorophyll, and also differ in being composed not of expansions or masses of cells like the algae, but of numbers of delicate interlacing tubes or *hyphae*, often forming, as in the mushroom, quite large and complicated structures. *Lichens* are an interesting class between *Algae* and *Fungi*, inasmuch as they are built up of an alga and a fungus, which live together and are mutually dependent on each other.

Going a step higher we reach the *Mosses*, where, for the first time, we distinguish a clear differentiation of the part of the plant above ground into a stem and leaves borne upon it. The stem is attached to the soil by delicate colorless hairs—*root-hairs*. Its structure is, however, very simple, and the leaves are merely thin plates of cells. Rising still higher to the fern-like plants, including *Equisetums* (Horsetails) and *Lycopods* (Clubmosses), we notice a great advance in complexity, both of external form and internal structure. The leaves are large, often much branched, the stem stout and firm, while instead of the few simple hairs which was all the indication of a root-system to be found in the moss, there are well-developed true roots. Microscopical examination of sections of stem, leaf, or root reveals great differences in structure between various groups of cells; there is, in fact, marked *differentiation of tissues*. A tissue is a layer, row, or group of cells which have all undergone a similar development; by *differentiation of tissues* we mean that various layers, rows, or groups have developed in different ways, so that we

can make out and mark by distinctive names the elements of which a stem or leaf is built up. The structure of thallophytes and mosses is very simple, but in the ferns, besides other well-marked tissues, we meet with one of so great importance in the higher plants and so constantly present that it is used as a distinctive characteristic of all the plants above the mosses. Ferns and flowering plants which contain this *vascular tissue* are known as *vascular plants*, in contrast to the thallophytes and mosses, or *cellular plants*, where it is not found. Microscopical examination of a very thin longitudinal slice of the stem, root, or leaf-stalk of a vascular plant reveals bundles of long cells running lengthwise, the walls of which are not uniformly thin, as in the cells making up the groundwork of the portion examined, but are covered with curious markings which are seen to represent local thickenings of the walls, thin places, or *pits*, being left between them. These cells, which are quite empty, are the wood cells; they are placed end to end, and when, as frequently occurs, the end-walls separating the cavities of two cells become absorbed, a wood vessel is formed. Near the elements of the wood, but differing greatly from them in their delicate, unchanged walls and thick, viscid contents, are the *bast-vessels*, or *sieve-tubes*, so called from the end-to-end communication between two cells being established, not by absorption of the whole wall, but by its perforation at numerous spots, forming a sieve, or cribriform, arrangement. This combination of wood and bast vessels forms the essential part of what is therefore known as *vascular tissue*.

Phanerogams, or *Flowering Plants*, represent the highest group of plants; *Seed-plants* would be a better name, as their main distinction from those already described is the production of a *seed*. The much greater variety in form and structure seen in them as compared with the ferns justifies us in regarding them as the highest group in the vegetable kingdom. They are divided into two classes. (1) Those in which the seed is developed on an open leaf, termed a *carpel*, and called therefore *Gymnosperms* (Gr. *gymnos*, naked, and *sperma*, seed); and (2) those in which the seed is developed in a closed chamber, formed by the folding together of one or more carpels, and called accordingly *Angiosperms* (Gr. *angeion*, vessel). To the former belong the *Conifers*—pines and firs—and *Cycads*; to the latter the rest of our trees and the enormous number of field and garden plants which are not

Seeds or mosses. Angiosperms again are subdivided into *Monocotyledons*, where the embryo or young plant contained in the seed has only one primary leaf; and *Dicotyledons*, where an opposite pair of such leaves is present. Like the last group, Phanerogams are differentiated into a shoot-portion above the ground, consisting of a stem bearing leaves, and a subterranean root-portion. Both stem and root are often copiously branched, so that one individual may cover a large area both above and below ground. Stem, leaves, and roots all show great variety in form and adaptation.

The embryo, or rudimentary plant contained in the seed, consists of a very short axis or stem, bearing one (in *Monocotyledons*), two (in *Dicotyledons*), or several (in many *Gymnosperms*) primary leaves, the *cotyledons*, above which it terminates in a little bud or *plumule*, while below them the axis passes into the primary root or *radicle*. When the seed germinates the radicle is the first to protrude between the separating seed-coats, and growing downwards fixes itself in the soil. Then the plumule grows out accompanied or not, as the case may be, by the cotyledons, which have hitherto concealed and protected it, and by a rapid growth soon develops into a stem bearing leaves. The stem continues growing in length at its apex throughout the life of the plant; at a short distance below the apex growth in length ceases; but while in *Gymnosperms* and *Dicotyledons* it also continually increases in thickness through its whole length, *Monocotyledons* are distinguished by the fact that when once the stem has been formed its diameter remains unchanged. The same rule applies to the branches. The cause of this difference is found in the internal structure. In the *Gymnosperm* and *Dicotyledon* a transverse section in a very young stage has the following appearance: Starting from the outside we have, (1) a single protective layer of cells with thick external walls, the *epidermis*. (2) Inside this, and forming what is called the *cortex*, are a number of thin-walled cells arranged like bricks in a wall, or touching only at their rounded edges, and leaving intercellular spaces. Such an arrangement, where there is no dove-tailing between the cells, is called *parenchymatous*. (3) Within the cortex a ring of vascular bundles, each consisting essentially of a little group of bast-vessels towards the outside and wood-vessels on the inside, separated by a single layer of cells, the *cambium-layer*. (4) Within the ring of

bundles the *pith*, of parenchyma like the cortex, and united to it by strands of similar parenchymatous cells passing between the bundles and known as *medullary rays*. As the young stem grows, however, the spaces between the bundles are filled up by development of fresh bast, cambium, and wood, so that instead of a number of separate bundles there is a complete vascular ring. The cambium-ring remains in active growth throughout the whole life of the plant, and by producing new bast on the outside and wood on the inside causes continual increase in thickness. The epidermis, which would of course soon give way beneath the strain of the growth inside, is replaced as a protective layer by the *bark*, development of which keeps pace with increase in diameter. Now in the young *monocotyledonous* stem, instead of a few bundles arranged in a ring separating pith from cortex, a great number are scattered through the whole internal parenchymatous tissue, so that we cannot distinguish any pith at all. The bundles, moreover, have no cambium-layer, so that when once formed their development is complete, and there is no increase in thickness. Stems, which may be *simple* or *branched*, are either *aërial* or *subterranean*. *Aërial* forms are: (1) *Erect*, as the trunks of trees, or the more slender stems of most herbaceous plants, or the hollow *culms* of grasses. (2) *Prostrate*, as the creeping runners of the strawberry. (3) *Climbing*, in which case they may either twine round a support, like the hop; or hold on by means of *prickles*, like the bramble; or more usually by *tendrils*, as in the vine; or, finally, by *root-fibers* given off from the stem, as in the ivy. Examples of subterranean stems are: (1) the *rhizome*, a horizontal stem sending forth *aërial* shoots from its upper and roots from its lower surface; (2) the *tuber*, a much-swollen fleshy stem, like the potato, the eyes of which are buds; (3) the *bulb*, a very short undeveloped stem with crowded, overlapping leaves, as the onion.

Branches proceed from buds which are formed in the autumn in the axils of the leaves, that is, at the point where the leaf or leaf-stalk is joined on to the stem; they remain dormant through the winter, and grow out into new shoots in the spring.

The *leaf* is borne on the stem; its tissues, epidermal, cortical, and vascular, are continuous with those of the stem; but it is distinguished by the fact that its growth is limited, it soon reaches the

normal size and stops growing. The places where leaves come off from the stem are called *nodes*. There is great variety both in the position and form of leaves. Their *position* is said to be *radical* when they are all borne close together at the base of the stem, as in the dandelion; or *cauline*, when they are borne on the upper parts; in the latter case they may have a *whorled* arrangement, where several come off at the same level in a circle round the stem, as in the herb Paris; or *opposite*, where two stand on opposite sides at each node, as in the gentians; or *alternate*, where only one comes off at any one level. The study of leaf arrangement is known as *phyllotaxy*. A leaf may be *stalked* or *sessile*; if *sessile*, the blade is joined directly on to the stem. The stalk is known as the *petiole*, the flattened expanded blade as the *lamina*. The leaf may be *simple* or *compound*. A simple leaf cannot be divided without tearing the lamina; while a compound leaf is made up of independent leaflets, which may come off from the same point, as in the horse-chestnut, which is the *digitate* form; or may be arranged along a continuation of the petiole, as in the ash, which is the *pinnate* form of a compound leaf. The tissue of the lamina is traversed by vascular bundles, which are continuous through the petiole with those of the stem. The great variety of their ramifications is the cause of the often very characteristic *venation* of the leaves. Leaves are said to be *deciduous* when they fall annually, as they do in the most common forest-trees; or *persistent* when they last longer, as in the firs, laurels, etc. Leaves of phanerogams are often very much modified or *metamorphosed*; thus the spines of the cactus are metamorphosed or modified leaves, as are also several forms of those curious leaf-growths known as pitchers, and many tendrils, such as those of the pea tribe. When we consider the flower we shall find that its various members are all more or less modified leaves.

In Dicotyledons and Gymnosperms the primary root or radicle after emerging from the seed continues to grow vigorously, often with copious lateral branching, forming an extensive root-system; but in Monocotyledons it soon perishes, and its place is taken by roots developed from the base of the stem; such roots are called *adventitious*. Adventitious roots occur also in Dicotyledons, as in creeping stems like the strawberry, which bears buds at intervals from which new shoots are formed and roots given off. The clinging roots of the ivy are also adventitious.

There are many forms of roots; some are large and woody, as those of trees; others fibrous, as in grasses; or they may be greatly swollen, forming the fleshy, globose root of the turnip or the conical one of the carrot. Such fleshy developments are due to the plant storing up a quantity of reserve food-material in the first year on which to draw in the second, when it will want to expend all its energy in flowering and fruiting. The potato, which is a swollen stem, answers the same purpose. The mistletoe and other parasites give off sucker-like roots which penetrate into the tissues of their host.

As to their reproduction, plants may be *asexual*, that is, not requiring the co-operation of two distinct (male and female) elements to produce a new individual; or *sexual*, when two such elements are necessary, and a process of fertilization takes place in which the female cell is impregnated by one or more male cells, and the cell resulting from the fusion of the two gives rise by very extensive growth and division to a new individual. In the very lowest plants, like Protococcus, only asexual reproduction is known, but in most Thallophytes both forms occur. In the asexual method numbers of small cells called *spores* are produced which on germination give rise to a plant similar to that which bore them. In the sexual process the contents of a male organ escape and impregnate the *oosphere*, or female cell contained in the female organ. The fertilized oosphere is termed an *oospore*, and by growth and division gives rise to a plant like that on which it was produced. In mosses and fern-like plants both sexual and asexual reproductions occur; but here the history of the life of the plant is divided into two stages, one in which it exists as an asexual individual, another in which it is sexual. In the fern, for instance, brown marks are seen on the back of some of the leaves, these are little cases containing spores; the fern as we know it is an asexual individual producing spores. The spores when set free germinate on a damp surface and produce not a new fern-plant, but a tiny green heart-shaped cellular expansion, called a *prothallium*, attached to the substratum by delicate root-hairs. Microscopical examination of its under surface reveals the sexual organs, a male organ producing motile male cells, which escape, pass into the female organ, and fertilize the oosphere, which then becomes the oospore. The oospore does not produce a new prothallium, but a fern-plant like the one with which we originally started. The cycle is thus complete.

The flower of a seed-plant is a shoot modified for purposes of reproduction. A buttercup, for instance, consists of a number of modified leaves borne in several whorls on the somewhat expanded top of the stalk, the *receptacle* or *thalamus*. Dissection of the flower shows (1) An outer whorl of five green leaves, very like ordinary foliage leaves; these are the *sepals*, and together make up the *calyx*. (2) An inner whorl of five yellow leaves composing the *corolla*, each leaf being a *petal*. (3) More or less protected by the petals are a great number of *stamens*, each consisting of a slender stalk or *filament* capped by an *anther*, a little case containing the dry powdery *pollen*. The stamens are really much-modified leaves; collectively they form the *andracium*. (4) The rest of the receptacle right up to the apex is also covered by very much modified leaves, the *carpels*, forming the *pistil* or *gynacium*. Each carpel consists of a basal portion, the *ovary*, in which is contained an *ovule*, and of a terminal beak-like portion, the *style*. The andracium and gynacium, being the parts directly concerned in reproduction, are distinguished, as the *essential* organs of the flower, from the *calyx* and *corolla*, which are only indirectly so concerned, though of great importance in the process. The ovule contained in the ovary is equivalent to the spore produced by the fern, but instead of escaping and producing an independent sexual individual it remains in the ovary, where processes go on *within* it corresponding to those resulting in the formation of the free and independent prothallium of the fern, and finally an *oösphere* is produced. Pollen from the stamen of the same or another plant has meanwhile been brought on to the special receptive portion of the style known as the *stigma*, where it protrudes a long tube which reaches right down through the style to the ovule. This tube represents the male element; it comes into close contact with the *oösphere* and fertilizes it. The *oösphere* then becomes an *oöspore*, which by growth and division forms the *embryo* or new plant, while still included in the coats of the ovule. The ovule thus becomes the seed, which ultimately leaves the mother plant, bearing with it the embryo.

In the buttercup the members of each whorl of leaves composing the flower spring from the receptacle quite independently of each other, and of those of adjoining whorls. In many flowers, however, *cohesion* takes place between the similar members of a whorl; thus the petals frequently cohere to a greater or less distance from their base, and two

great divisions of the Dicotyledons depend on this condition, namely, *Poly-petala*, where the petals are free, as in the buttercup and poppy; and *Gamopetala*, with more or less coherent petals, as in the bluebell and primrose. Similarly the gynacium, instead of being composed of free carpels as in the buttercup, the *apocarpous* condition, may be formed by the cohesion of several carpels into a one to several chambered *compound ovary*, as in the snapdragon, when it is said to be *syncarpous*. Adhesion also occurs between members of different whorls; thus the stamens are frequently inserted on the base of the petals, so that if we pull off a petal a stamen comes with it; and sometimes, as in orchids, the andracium and gynacium are adherent. If the other floral whorls are inserted on the receptacle beneath the pistil they are said to be *hypogynous* and the pistil *superior*, as, for instance, in the poppy; if, on the other hand, as in the fuchsia, they spring from the top of the ovary, they are said to be *epigynous* and the pistil *inferior*.

An important characteristic is the *fruit*, which is the result of fertilization on the ovary. While the changes are going on by which the ovule becomes the seed the ovary also grows, often enormously, and forms the *pericarp*, which surrounds and protects the seed or seeds. The pericarp consists of an outer layer or *epicarp*, a middle layer or *mesocarp*, and an inner or *endocarp*. The outer usually forms the skin of the fruit; the two others may be succulent as in the berry, or the mesocarp only may be succulent and the endocarp hard and stony as in the plum. Besides the embryo the seed contains a store of food-material on which the young plant feeds during the first stages of its growth. This consists of albuminous, starchy, or fatty matter. In what are called *albuminous* seeds, as those of palms, the seed is chiefly composed of food-material in which is embedded a small embryo; the edible part of a cocoanut is the albuminous reserve material. In other seeds, like the bean, the fleshy cotyledons have already absorbed this food-material into themselves, and the seedling draws on its own cotyledons for support; these seeds are known as *exalbuminous*.

It was stated above that the ovule might be fertilized by pollen from the same flower or from another plant; experiment has shown that the latter produces better results, both as regards quality and quantity of seed, and the vigor of the seedlings. That is, *cross-fertilization* is preferable to *self-fertilization*, and the various, often extremely curious, shapes of a flower and its parts are mainly for

the purpose of ensuring the former and preventing the latter.

Many flowers contain both stamens and pistil, these are termed *bisexual* or *hermaphrodite* (♂); while others contain stamens or pistil only, and are said to be *unisexual*. When both male (♂) and female (♀) flowers occur on the same plant the species is *monocious*, like the hazel; while it is *dioecious* if the separate sexes are borne on different individuals, as is the case in the hop.

Plants which, like the sunflower, pass through all the stages from germination to production of fruit and seed in one season, and then perish, are called *annuals*; if two years are required, as with the turnip and onion, they are *biennials*; while *perennials* last several to many years, during which they may flower and seed many times.

Physiology.—A plant is built up chiefly of four elements: carbon, hydrogen, oxygen, and nitrogen, with small quantities of sulphur, iron, phosphorus and other mineral matter. Substances containing these must therefore form the food. A green plant can take up its carbonaceous food in a very simple form by means of the green *chlorophyll* contained especially in its leaves. This absorbs some of the sun's rays, and by virtue of the energy represented by the light so absorbed it can obtain the carbon from the carbonic acid gas present in the atmosphere. An animal, having no chlorophyll, has to use more complex carbon-containing compounds; in fact, those which have already been worked up in the vegetable kingdom. The other items of the food are obtained from the water and mineral salts in the soil, the salts being brought into solution and absorbed with large quantities of water by the roots. The leaves are the laboratory where the food is worked up into the complex compounds which form the plant substance, and to raise the crude material from the absorbing roots to the leaves there is an upward current of liquid through the stem. This is known as the *transpiration current*; it travels in the wood-cells. A much larger quantity of water is absorbed than is required as food; this is got rid of by *transpiration*, that is, by the giving off of water-vapor from the leaves. This is evident if a plant be placed under a glass shade in the sunlight, the vapor given off becoming condensed on the glass. The complex compounds elaborated in the leaves are returned to all parts of the plant where growth, or storage of reserve material, is taking place, by means of the other constituent of the vascular bundle, the bast tissue.

Fungi and a few seed-plants contain no chlorophyll and cannot therefore get their carbonaceous food from the carbonic acid gas of the atmosphere, but have to live on decaying vegetable or animal matter, whence they are termed *saprophytes* (Greek *sapros*, rotten), like mushrooms, or on living plants or animals, when they are *parasites*; such are the fungi which cause diseases in these organisms. Plants, like animals, breathe; respiration goes on both day and night, and is represented by the absorption of oxygen from and the return of carbonic acid gas to the atmosphere. If we prevent a plant from breathing, that is keep it in an atmosphere containing no free oxygen, it will sooner or later die.

Systematic Botany.—In botany, as in zoology, individuals which closely resemble each other form collectively a *species*. Where existing differences are considered too minute to constitute difference of species the set of individuals in which they occur ranks as a *variety* of the species. A group of species which, though having each some distinctive peculiarity, yet on the whole resemble each other, constitutes a *genus*. Assemblages of genera agreeing in certain marked characters form *families* or *natural orders*. The names of the orders are generally formed on the type of *Rosaceæ*, the rose order, *Ulmaceæ*, the elm order, etc. *Classes*, such as *Monocotyledons* and *Dicotyledons*, contain a large number of natural orders. The older systems of classification were based largely on the uses of plants, for they were studied simply from a medicinal or generally economic point of view. In 1682, however, John Ray discovered the difference between *Monocotyledons* and *Dicotyledons*, and published an arrangement of plants founded on their structural forms, especially on the characters afforded by the seed; this formed the basis of the *natural* system of classification, one, that is, which brings together those genera and families which a careful comparative study of the whole structure and development shows to be most nearly related. Linnaeus did not recognize Ray's great primary divisions, and his system (1735) is a purely *artificial* one, since it takes account only of a few marked characters afforded by one or two sets of organs, and does not propose to unite plants by their natural affinities. He divides *Phanerogams* into twenty-three classes, chiefly according to the number and character of the stamens; each class is subdivided into orders based on the number and character of the styles. Owing to the exclusive part played by the sexual organs, this arrange-

Botany Bay

Bothriocephalus

ment is known as the *sexual system*. The great value of Linnaeus's work was his careful scientific revision and adjustment of all the known genera, and his introduction of the binomial system of nomenclature, in which every species has a double name, that of the genus to which it belongs coming first, then that of the species; thus *Bellis perennis* L. is the daisy, and the name shows that the species *perennis* of the genus *Bellis* is the plant in question. The L. which follows indicates that we mean the plant so named by Linnaeus. The sexual system is now only of historic interest. By the sagacity of the de Jussieus the genera of Linnaeus were more or less naturally grouped under Ray's primary divisions; and by the subsequent labors of de Candolle, Robert Brown, Lindley, and many others we have attained to a fairly natural system, according to the latest edition of which, the *Genera Plantarum* of Bentham and Hooker, all our great collections are arranged.

Angiosperms are grouped in fourteen classes under the two main divisions, Monocotyledons and Dicotyledons. The former comprise three classes distinguished by the relative position of the ovary and stamens. The latter comprise eleven classes based on the same set of characters, and are subdivided into Apetalæ, Monopetalæ and Polypetalæ. In the arrangement of A. P. de Candolle the Dicotyledons fall into two groups, a larger in which the flower presents both calyx and corolla; and a smaller called Monochlamydeæ. The dichlamydeous group falls into three divisions: Thalamifloræ, Calycifloræ and Corallifloræ. This, distinguished as the French system, finds expression in the *Genera Plantarum* of Bentham and Hooker in the following subdivision:

Dicotyledons.

Polypetalæ

{ Thalamifloræ
Discifloræ
Calycifloræ

Gamopetalæ

{ Heteromera
Bicarpellatæ
Inferæ

Monochlamydeæ in eight series
Monocotyledons in seven series

Thalamifloræ contains 34 orders distributed in 6 groups or cohorts; Discifloræ, 23 orders in 4 cohorts; Calycifloræ, 27 orders in 5 cohorts. Of the Gamopetalæ, Inferæ contains 9 orders in 3 cohorts; Heteromera, 12 orders in 3 cohorts; Bicarpellatæ, 24 orders in 4 cohorts. The eight series of Monochlamydeæ contain 36 orders.

Botany Bay, a bay in New South Wales, so called by

Captain Cook on account of the great number of new plants collected in its vicinity. The English penal settlement, founded in 1788, and popularly known as Botany Bay, was established on Port Jackson, some miles to the northward, near where Sydney now stands.

Botany Bay Oak, a name of trees of the genus *Casuarina*. See *Beef-wood*.

Botfly, BOTFLY, a fly (such as *Cestrus equi*) the maggots of which are developed from the egg in the intestines of horses or under the skins of oxen; a gadfly.

Both (bôt), JOHN and ANDREW, two Flemish painters, born about 1610. John painted landscapes, Andrew filling in figures in so careful a manner that their pictures look like the work of one hand. Their works are in great repute. Andrew was drowned at Venice in 1650. John died at Utrecht shortly after.

Botha (bô'tha), LOUIS, a Boer general, born at Greytown, Natal, in 1864. He took part in the Kaffir campaign, became a prominent member of the Volksraad at Pretoria, and in the British-Boer war of 1899-1902 defeated the British at Colenso and Spion Kop and after the death of General Joubert succeeded him in command of the Boer forces. After the reorganization of the country as a British colony, he became active in political affairs, and on the formation of the Union of South Africa federation in 1910 he was made prime minister in the new government. During the European war he was commander-in-chief of the Union Forces in Southwest Africa, and in 1915 he achieved complete success, receiving the surrender of the German army in German Southwest Africa. He was one of the signers of the treaty of peace, June 28, 1919. He died at Pretoria Aug. 28, 1919.

Bothie (both'i; Gael, *bothag*, a cot), a house, usually of one room, for the accommodation of a number of work-people engaged in the same employment; especially, a house of this kind in parts of Scotland, in which a number of unmarried male or female farm servants or laborers are lodged.

Bothnia (both'ni-a), GULF OF, the northern part of the Baltic Sea, which separates Sweden from Finland. Length about 450 miles, breadth 90 to 130, depth from 20 to 50 fathoms. Its water is but slightly salt, and it freezes in the winter, so as to be passed by sledges and carriages.

Bothriocephalus (both-ri-ô-seph'a-lus), a genus of segmented worms, belong to the tapeworm family, one species of which (*B. latus*)

is found in the intestines of man in Russia, Norway, Sweden, Switzerland, Germany, etc., but rarely elsewhere. *B. latus* is the largest tapeworm infesting the human body. It may be 25 feet long and has 3000 or 4000 segments. The segments are 10 to 12 millimeters broad by 5 to 8 long. The head has two deep sucking furrows arranged longitudinally. Its eggs are oval, brownish, and develop in fresh water into ciliated, freely moving spheres.

Bothwell (both'wel), a village of Lanarkshire, Scotland, on the Clyde, 8 miles east of Glasgow. Here is Bothwell Bridge, where a decisive battle was fought in 1679 between the Scottish Covenanters and the royal forces commanded by the Duke of Monmouth, in which the former were totally routed. Near by are the fine ruins of Bothwell Castle, once a stronghold of the Douglases.

Both'well, JAMES HEPBURN, EARL OF, known in Scottish history by his marriage to Queen Mary, was born about 1526. One of the greatest nobles of Scotland, he lived an active and evil life, three years of it being spent in captivity or exile. After the marriage of Mary to Darnley and the murder of Rizzio, the queen's favorite, by Darnley, the next event was the murder of Darnley in which it is believed that Bothwell was deeply concerned, and that he was even supported in the act by the queen. He was charged with the crime and tried, but, appearing along with 4000 followers, was readily acquitted. He was now in high favor with the queen, and with or without her consent he seized her at Edinburgh, and carrying her a prisoner to Dunbar Castle prevailed upon her to marry him after he had divorced his own wife. But by this time the mind of the nation was roused on the subject of Bothwell's character and actions. A confederacy was formed against him, and in a short time Mary was a prisoner in Edinburgh, and Bothwell had been forced to flee to Denmark, where he died in 1576.

Botocudos (bo-to-cū'dos), a Brazilian race of savages who live 70-90 miles from the Atlantic, in the virgin forests of the coast range. They receive their name from the custom which they have of cutting a slit in their under lip, and in the lobes of their ears, and inserting in these, by way of ornament, pieces of wood shaped like the bung of a barrel (Portug. *botoque*). They are very skillful with the bow and arrow, and live chiefly by hunting. They number only a few thousands, and are decreasing.

Botoshani (bo-to-shā'ni), a town of Roumania, in the north of Moldavia. Pop. 32,193.

Bo-tree, the *Ficus religiosa*, a sacred fig-tree of India and Ceylon, venerated by the Buddhists and planted near their temples. One specimen at Anuradhapoora in Ceylon is said to have been planted before 200 B.C. It was greatly shattered by a storm in 1887.

Botrychium (bo-trik'l-um), a genus of ferns, of which *B. Virginicum*, the largest species, is a native of North America, New Zealand, the Himalayas, etc.

Botrytis (bo-tri'tis), a genus of fungi section Hyphomycetes, containing a number of plants known as moulds and mildews, some of them having the habit of growing in the tissues of living vegetables, to which they are extremely destructive. The decay of the leaves and stem in the potato disease is due to *B. infestans*; but whether this plant is the origin of the disease seems doubtful. The plants of the genus consist of a mycelium of interwoven threads.

Botta (bot'ta), CARLO GIUSEPPE, an eminent Italian historian, born at San Giorgio, Piedmont, about 1768; died in Paris in 1837. Studying medicine, he was in 1797 appointed surgeon to the French army in Italy and in 1803 was elected to the legislative body of France. His works comprise a *History of the War of American Independence*; *History of Italy from 1789 to 1814*, a very able work; *A History of the Nations of Italy from Constantine to Napoleon*, etc.

Botta, PAUL EMILE, a French traveler and archaeologist, born about 1800. In 1833 he was appointed French consul at Alexandria. He undertook a journey to Arabia in 1837, described in his *Relation d'un Voyage dans l'Yémen*. He discovered the ruins of ancient Nineveh in 1843 while acting as consular agent for the French government at Mosul. As a result of his investigations he published two important works—one on the cuneiform writing of the Assyrians (*Mémoire de l'écriture Cunéiforme Assyrienne*), and the other upon the monuments of Nineveh (*Monuments de Ninive*, five vols. folio, with drawings by Flamin, Paris, 1846-50), the latter of which is a work of great splendor, and makes an era in Assyrian antiquities. He earned the credit of being the first to open the rich mine of Assyrian sculptures. He died in 1870.

Bottger, or BÖTTIGER (beut'gér, beut'gér), JOHANN FRIEDRICH, a

Botticelli

German alchemist, the inventor of the celebrated Meissen porcelain, was born in 1682. His search for the philosopher's stone or secret of making gold led him into many difficulties. At last he found refuge at the court of Saxony, where the elector erected a laboratory for him, and forced him to turn his attention to the manufacture of porcelain, resulting in the invention associated with his name. He died in 1719.

Botticelli (bot-te-chel'la), SANDRO (for *Alessandro*), an Italian painter of the Florentine school, born in 1447; died in 1510. Working at first in the shop of the goldsmith Botticello, from whom he takes his name, he showed such talent that he was removed to the studio of the distinguished painter Fra Lippo Lippi. From this master he took the fire and passion of his style, and added a fine fantasy and delicacy of his own. He painted flowers, especially roses, with incomparable skill. In his later years Botticelli became an ardent disciple of Savonarola, and is said by Vasari to have neglected his painting for the study of mystical theology.

Böttiger (beu'ti-ger), KARL AUGUST, a German archæologist, born in 1760; died in 1835. After studying at Leipzig, he became director of the gymnasium at Weimar, and it was here that, while he enjoyed the society of Goethe, Schiller, Wieland, and other distinguished men, he began his literary career. In 1814 he was appointed chief inspector of the Museum of Antiquities in Dresden, where he continued to reside to the end of his life. Among his most important works are: *Sabina, oder Morgenscenen einer reichen Römerin* (Sabina, or Morning Scenes of a Wealthy Roman Lady); *Griechische Vasengemälde* (Paintings on Greek Vases); *Ideen zur Archæologie der Malerei* ('Thoughts on the Archæology of Painting').

Bottle (bot'l), a vessel with a narrow mouth, for holding liquids. By the ancients they were made of skins of animals, and skin bottles are still used in S. Europe, Asia and Africa. Bottles of stone, alabaster, gold, etc., of artistic design, were made by the Egyptians. Modern bottles are chiefly made of glass or earthenware. *Vacuum bottles* are those fitted with a vacuum jacket which preserves the liquids at a nearly constant temperature. They are made of glass, and are protected by an outer casing of aluminum or other metal.

Bottlegourd, a kind of gourd, genus *Lagenaria*, the dried fruits of which, when the pulp is re-

Bouches-du-Rhone

moved, are used in warm countries for holding liquids.

Bottlenose, a kind of whale, of the dolphin family, genus *Hyperoodon*, 20 to 28 feet long, with a beaked snout and a dorsal fin, a native of northern seas. The caaing whale is also called bottlenose.

Bottletree (*Delabechea rupestris*), a tree of Northeastern Australia, order Sterculiaceæ, with a stem that bulges out into a huge, rounded mass.



Bottletree (*Delabechea rupestris*).

It abounds in a nutritious mucilaginous substance.

Bottomry (bot'um-ri), is a contract by which a ship is pledged by the owner or master for the money necessary for repairs to enable her to complete her voyage. The freight and even the cargo may be pledged as well as the ship. The conditions of such a contract usually are that the debt is repayable only if the ship arrives at her destination. As the lender thus runs the risk of her loss, he is entitled to a high premium or interest on the money lent. The latest bottomry bond takes precedence of all previous ones.

Botzen (bôt'zen), or BOZEN, an old town in the Austrian Tyrol, well built, at the junction of roads from Switzerland, Germany, and Italy, which makes it an important forwarding station and the busiest town in the Tyrol. It has silk and cotton manufactures, tanneries, dye-works, and largely-attended annual fairs. Pop. 13,632.

Bouches-du-Rhone (büsh-dü-rôn; 'Mouths of the Rhone'), a dep. in the s. of France, in ancient Provence. Chief town, Marseilles. Area, 2026 sq. miles, of which about one-half is under cultivation. The Rhone is the principal river. The climate is generally very warm; but the dep. is liable to the *mistral*, a cold and violent N.E. wind from the Cevennes ranges.

Much of the soil is unfruitful, but the fine climate makes the cultivation of figs, olives, nuts, almonds, etc., very successful. The manufactures are principally soap, brandy, olive-oil, chemicals, vinegar, scent, leather, glass, etc. The fisheries are numerous and productive. Pop. 765,918.

Boucicault (bō'si-kō), DION, dramatic author and actor, born at Dublin, Dec. 20, 1822, and educated partly at London University. He was intended for an architect, but the success of a comedy, the well-known *London Assurance*, which he wrote when only nineteen years old, determined him for a career in connection with the stage. Boucicault being a remarkably facile writer, in a few years had produced quite a lengthy list of pieces, both in comedy and melodrama, and all more or less successful. We may mention *Old Heads and Young Hearts*, *Love in a Maze*, *Used Up*, and *The Corsican Brothers*. In 1853 he went to America, where he was scarcely less popular than in England. On his return in 1860 he produced a new style of drama, dealing largely in sensation, but with more heart in it than his earlier work. The *Colleen Bawn* and *Arrah-na-Pogue* are the best examples. Indeed, Mr. Boucicault's best work was seen in these pictures of Irish life and manners. His dramatic pieces are said to number upwards of 150. He died Sept. 18, 1890.

Boudoir (bō'dwār), a small room, elegantly fitted up, destined for retirement (from Fr. *bouder*, to pout, to be sulky). The boudoir is the peculiar property of the lady, where only her most intimate friends are admitted.

Boufflers, or BOUFLERS (bō-flār), LOUIS FRANÇOIS, DUC DE, Marshal of France, one of the most celebrated generals of his age, was born in 1644; died in 1711. He learned the art of war under such renowned generals as Condé, Turenne, and Catinat. His defense of Namur against King William of England and of Lille against Prince Eugene are famous, and he conducted the retreat of the French at Malplaquet with such admirable skill as quite to cover the appearance of defeat.

Bougainville (bō-gan-vël), LOUIS ANTOINE DE, a famous French navigator, born at Paris in 1729. At first a lawyer, he afterwards entered the army and fought bravely in Canada under the Marquis of Montcalm, and it was principally due to his exertions, in 1758, that a body of 5000 French withstood successfully a British army of 16,000 men at Ticonderoga. After the battle of September 13, 1759, in which Montcalm was killed and the fate of the

colony decided, Bougainville returned to France, and served with distinction in the campaign of 1761 in Germany. After the peace he entered the navy, and became a distinguished naval officer. In 1763 he undertook the command of a colonizing expedition to the Falkland Islands, but as the Spaniards had a prior claim the project was abandoned. Bougainville then made a voyage round the world, which enriched geography with a number of new discoveries. In the American war of independence he distinguished himself at sea, but withdrew from the service after the Revolution, and died in 1811.

Bougainville Island (see above), an island in the Pacific Ocean belonging to the Solomon group (area, 4000 sq. miles), and under German protection. It is separated from Choiseul Island by *Bougainville Strait*.

Boughton (bow'ton), GEORGE H., an English painter, born 1830; died, 1905. He resided for a time in Albany, N. Y., but in 1859 returned to England. Among his best paintings are *Lake of the Dismal Swamp*, *The Scarlet Letter*, *The Return of the Mayflower*, *Coming through the Rye*, *Passing into the Shade*.

Bougies (bō-zhêz; the French word for tapers), in surgery applied to certain smooth cylindrical rods which are introduced into the canals of the human body in order to widen them, or more rarely to apply medicaments to a particular part in the interior of the body. They are distinguished from catheters by being quite solid. They are made sometimes of linen dipped in wax and then rolled up, sometimes of a kind of plaster and linen, also of caoutchouc or gutta-percha, or of metal, such as lead, silver, or German silver.

Bouguer (bō-gā), PIERRE, a French mathematician and astronomer, born in 1698. He was associated with Godin and La Condamine in an expedition to the South American equatorial regions to measure the length of a degree of the meridian. The main burden of the task fell upon Bouguer, who performed it with great ability, and published the results in his *Théorie de la Figure de la Terre*. He also invented the heliometer, and his researches upon light laid the foundation of photometry. He died in 1758.

Bouguereau (bōg-rō), ADOLPHE GUILLAUME, born at La Rochelle, France, in 1825; died at Paris in 1905. On leaving college he engaged in business in Bordeaux, where he at the same time studied art under M. Alaux.

Bouillon

and at the end of the first year won first prize. Then he became a pupil of M. Picot in Paris, and in 1854 won the Roman prize. He had already become prominent in the École des Beaux-Arts, and soon advanced to high rank in his profession, eventually becoming President of the Society of Artists, and one of the most popular artists of the century.

Bouillon, GODFREY. See *Godfrey of Bouillon*.

Boulanger (bō-lān-zhā), GEORGES ERNEST JEAN MARIE, a French general, born at Rennes in 1837. He served ably in the Franco-German war and in 1886 was made minister of war. His free criticism of the authorities and general insubordination caused his arrest and dismissal from the army, but his following was strong and he was elected deputy. 'Boulangism' grew so formidable that the authorities prosecuted him in 1889. He fled from the country, was condemned in his absence and committed suicide in Brussels in 1891.

Boulder (bōl'dér), a rounded water-worn stone of some size; in geology applied to ice-worn and partially smoothed blocks of large size lying on the surface of the soil, or embedded in clays and gravels, generally differing in composition from the rocks in their vicinity, a fact which proves that they must have been transported from a distance, probably by ice. When lying on the surface they are known as *erratic blocks*. The *boulder-clay* in which these blocks are found belongs to the post-tertiary or quaternary period. It occurs in many localities, consists of a compact clay, often with thin beds of gravel and sand interspersed, and is believed to have been deposited from icebergs and glaciers in the last glacial period.

Boulder, a city, county seat of Boulder Co., Colorado, 29 miles from Denver. Tungsten, gold, silver, lead, copper, coal, iron, oil, gas, fire clays and kaolin abound, and there is a large milling and elevator company. Here is located the State University. Pop. 10,000.

Boulevard (bōl-vār, bō'le-vard), a word formerly applied to the ramparts of a fortified town, but when these were leveled, and the whole planted with trees and laid out as promenades, the name boulevard was still retained. Modern usage applies it also to many streets which are broad and planted with trees, although they were not originally ramparts. The most famous boulevards are those of Paris. See *Paris*.

Boulogne (bō-lon-yè or bō-lōn), or BOULOGNE-SUR-MER, a fortified seaport of France, dep. Pas de Calais,

Bounty

at the mouth of the Liane. It consists of the upper and lower town. The former is surrounded with lofty walls, and has well-planted ramparts; the latter, which is the business part of the town, has straight and well-built streets, and is semi-English in character and language. In the castle, which dates from 1231, Louis Napoleon was imprisoned in 1840. Boulogne has manufactories of soap, earthenware, linen and woolen cloths; wines, coal, corn, butter, fish, linen and woolen stuffs, etc., are the articles of export. Steamboats run daily between this place and England, crossing over in two or three hours. Napoleon, after deepening and fortifying the harbor, encamped 180,000 men here with the intention of invading Britain at a favorable moment; but, upon the breaking out of hostilities with Austria, 1805, they were called to other places. Pop. 53,128, about a tenth being English.

Boulogne, BOIS DE. See *Bois de Boulogne*.

Boulogne-sur-Seine, a town of Seine, southwest of Paris, of which it is a suburb. It is from this place that the celebrated Bois de Boulogne gets its name. Pop. 57,027.

Boulton (bōl'ton), MATTHEW, a celebrated mechanic, was born at Birmingham in 1728; died there in 1809. He engaged in business as a manufacturer of hardware, and invented and brought to great perfection inlaid steel buckles, buttons, watch-chains, etc. In 1762 he added to his premises by the purchase of the Soho, a barren heath near Birmingham, where he established an extensive manufactory and school of the mechanical arts. The introduction of the steam-engine at Soho led to a connection between Boulton and James Watt, who became partners in trade in 1769.

Bounty (boun'ti), in political economy, is a reward or premium granted for the encouragement of a particular species of trade or production, the idea being that the development of such trade or production will be of national benefit. In Britain the idea of the inefficacy of bounties to sustain or develop commerce or manufactures is in general pretty well established, the usual argument being that it is nothing less than taxing the general community in order to encourage individuals to engage in businesses which, in the existing state of markets and competition, it would be better to let alone. Hence the British government has long given up the system of bounties, except in such peculiar cases as the subsidies granted for carrying the oceanic mails.—The same name is given to a premium

offered by government to induce men to enlist in the public service, especially to the sum of money given in some states to recruits in the army and navy.

Bourbaki (bôr-ba-kê), a French general of Greek descent, born at Pau in 1816. He entered the souave corps as sublieutenant in 1836, served with great distinction in Africa and in the Crimea, became a brigadier in 1854 and a division general in 1857. He commanded the army of the East in the Franco-German war, and after his troops were driven over the Swiss frontier and interned there, he shot himself. He recovered from the wound, however, and was made soon after military governor of Lyons, and later on took command of the 14th corps, resigning in 1879. He died in 1897.

Bouquetin (bô'ke-tin). See *Ibex*.

Bourbon (bôr-bon), an ancient French family which has given three dynasties to Europe, the Bourbons of France, Spain, and Naples. The first of the line known in history is Adhemar, who, at the beginning of the 10th century, was lord of the Bourbonnais (now the dep. of Allier). The power and possessions of the family increased steadily through a long series of Archambaulds of Bourbon till in 1272 Beatrix, daughter of Agnes of Bourbon and John of Burgundy, married Robert, sixth son of Louis IX of France, and thus connected the Bourbons with the royal line of the Capets. Their son Louis had the barony converted into a dukedom and became the first Duc de Bourbon. Two branches took their origin from the two sons of this Louis, Duke of Bourbon, who died in 1341. The elder line was that of the Dukes of Bourbon, which became extinct at the death of the Constable of Bourbon in 1527, in the assault of the city of Rome. The younger was that of the Counts of La Marche, afterwards Counts and Dukes of Vendôme. From these descended Anthony of Bourbon, Duke of Vendôme, who by marriage acquired the kingdom of Navarre, and whose son Henry of Navarre became Henry IV of France. Anthony's younger brother, Louis, Prince of Condé, was the founder of the line of Condé. There were, therefore, two chief branches of the Bourbons—the royal and that of Condé. The royal branch was divided by the two sons of Louis VIII, the chief of whom, Louis XIV, continued the chief branch, whilst Philip, the younger son, founded the house of Orleans as the first duke of that name. The kings of the *elder French royal line* of the house of Bourbon were as follows: Henry IV, Louis XIII, XIV,

XV, XVI, XVII, XVIII, and Charles X. The last sovereigns of this line, Louis XVI, Louis XVIII, and Charles X (Louis XVII, son of Louis XVI never obtained the crown), were brothers, all of them being grandsons of Louis XV. Louis XVIII had no children, but Charles X had two sons, viz., Louis Antoine de Bourbon, Duke of Angoulême, who was dauphin till the revolution of 1830, and died without issue in 1844, and Charles Ferdinand, Duke of Berry, who died, 14th Feb., 1820, of a wound given him by a political fanatic. The Duke of Berry had two children: (1) Louise Marie Thérèse, called Mademoiselle d'Artois; and (2) Henri Charles Ferdinand Marie Dieudonné, born in 1820, and at first called Duke of Bordeaux, but afterwards Count de Chambord, who was looked upon by his party until his death (in 1883) as the legitimate heir to the crown of France.

The branch of the Bourbons known as the *house of Orleans* was raised to the throne of France by the revolution of 1830, and deprived of it by that of 1848. It derives its origin from Duke Philip I of Orleans (died 1701), second son of Louis XIII, and only brother of Louis XIV. A regular succession of princes leads us to the notorious Egalité Orleans who in 1793 died on the scaffold, and whose son Louis Philippe was king of France from 1830 to the revolution of 1848.

The *Spanish Bourbon dynasty* originated when in 1700 Louis XIV placed his grandson Philip, Duke of Anjou, on the Spanish throne, who became Philip V of Spain. From him descends the present occupant of the Spanish throne, Alphonso XIII, born in 1886.

The royal line of *Naples*, or the *Two Sicilies*, took its rise when in 1735 Don Carlos, the younger son of Philip V of Spain, obtained the crown of Sicily and Naples (then attached to the Spanish monarchy), and reigned as Charles III. In 1759, however, he succeeded his brother Ferdinand VI on the Spanish throne, when he transferred the *Two Sicilies* to his third son Fernando (Ferdinand IV), on the express condition that this crown should not be again united with Spain. Ferdinand IV had to leave Naples in 1806; but after the fall of Napoleon he again became king of both *Sicilies* under the title of Ferdinand I, and the succession remained to his descendants till 1860, when Naples was incorporated into the new kingdom of Italy.

Bourbon, CHARLES, DUKE OF, or CONSTABLE OF BOURBON, son of Gilbert, Count of Montpensier, was born

Bourbon

in 1489, and by his marriage with the heiress of the elder Bourbon line acquired immense estates. He received from Francis I, in the twenty-sixth year of his age, the title of Constable, and in the war in Italy rendered important services by the victory of Marignano and the capture of Milan. After occupying for years the position of the most powerful and highly honored subject in the realm he suddenly fell into disgrace, from what cause is not clearly known. But it is certain that the intrigues of the court party, headed by the king's mother and the Duke of Alençon, were threatening to deprive him both of honors and estates. The Constable, embittered by this return for his services, entered into treasonable negotiations with the Emperor Charles V and the King of England (Henry VIII), and eventually fled from France to put his sword at the service of the former. He was received with honor by Charles, who knew his ability, and being made general of a division of the imperial army, contributed greatly to the overwhelming defeat of Francis at Pavia. But Bourbon found that Charles V. was readier to make promises to him than to fulfil them, and he returned disappointed and desperate to the command of his army in Italy, an army nominally belonging to the emperor, but composed mostly of mercenaries, adventurers, and desperadoes from all the countries of Europe. Supplies falling short, and the emperor refusing to grant him more, the Constable formed the daring resolve of leading his soldiers to Rome and paying them with the plunder of the Eternal City. On May 6, 1527, his troops took Rome by storm, and the sacking and plundering continued for months. But Bourbon himself was shot at the head of his soldiers in scaling the walls.

Bourbon, ISLE OF. See *Réunion*.

Bourbon, a name often given to whiskey in the United States.

Bourbonnais (bör-bon-ä), a former province of France, with the title first of a county, and afterwards of a duchy, lying between Nivernais, Berry, and Burgundy, and now forming the department of the Allier. See *Bourbon*.

Bourbon-Vendée (bör-bön-vän-dä). NAPOLÉON - VENDÉE, a French town, now LA ROCHE-SUR-YON.

Bourchier (bör'chi-er), JOHN, LORD BERNERS. See *Berners*.

Bourdalone (bör-dä-lö), LOUIS, one of the great church orators of France, was born at Bourges in 1632,

Bourges

and entered the order of the Jesuits, becoming teacher of rhetoric, philosophy, and morals in the Jesuit college of his native place. In 1669 he entered the pulpit, and he preached for a series of years at the court of Louis XIV with great success. The lofty and dignified eloquence with which he assailed the vices of contemporary society brought him fame even at a time when Paris was ablaze with the feasts of Versailles, the glory of Turenne's victories, and the masterpieces of Corneille and Racine. After the repeal of the Edict of Nantes (1686) he was sent to Languedoc in order to convert the Protestants, a task in which he was not unsuccessful. His sermons are amongst the classics of France. He died in 1704.

Bourdon (bör'don), a bass stop in an organ or harmonium having a droning quality of tone.

Bourg (börg), or **BOURG-EN-BRESSE**, a town of Eastern France, capital of the dep. of Ain, well built, with a handsome parish church, public library, museum, monuments to Bichat, Joubert, and Edgar Quinet, and near the town the beautiful Gothic church of Brou, built in the early 16th century; some manufactures and a considerable trade. Pop. (1906) 13,916.

Bourgelat (börzh-lä), CLAUDE, creator of the art of veterinary surgery in France, born in 1712; died in 1779. He established the first veterinary school in his native town in 1762, and his works on the art furnished a complete course of veterinary instruction.

Bourgeois (bur-jö' or bur-jois), a size of printing type larger than brevier and smaller than long primer, used in books and newspapers.

Bourgeoisie (börzh-wä-zë), a name applied to a certain class of population in France, in contradistinction to the nobility and clergy as well as to the working classes. It thus includes all those who do not belong to the nobility or clergy and yet occupy an independent position, from financiers and heads of great mercantile establishments at the one end to master tradesmen at the other. The term was used by the leaders of the Bolsheviks (*q. v.*) in Russia to apply to all who were not of the laboring class. In America it is usually applied to the middle classes.

Bourges (börzh), an ancient city of France, capital of the dep. of Cher, situated at the confluence of the Auron and Yèvre, 124 miles s. of Paris, formerly surrounded with ramparts, now laid out as promenades. It has crooked and gloomy streets, and houses built in the old style. The most noteworthy

building is the cathedral (an archbishop's) of the 13th century, and one of the finest examples of Gothic in France. Bourges is a military center and has an arsenal, cannon-foundry, etc., manufactures of cloth, leather, etc. Pop. 45,375.

Bourget (bör-zhā), PAUL, a French novelist, born at Amiens in 1852. His literary career began with several volumes of striking verse and two volumes of *Essais*. His first novel, *L'Irréparable*, appeared in 1884. Many others followed, also *Sensations d'Italie*, and *Outre Mer*, a work of travel to the United States. He was elected to the French Academy in 1894.

Bourmont (bör-môn), LOUIS AUGUSTE VICTOR DE GRAISNE, COMTE DE, Marshal of France, born in 1773; died in 1846. Entering the republican army, he distinguished himself under Napoleon, who made him a general of division. After the restoration he readily took service with the new dynasty, and in 1830 commanded the troops which conquered Algiers, a success which gained for him the marshal's baton. After the revolution of 1830 he followed the banished Charles X into exile, but later retired to his estate in Anjou, where he died.

Bourne (börn), VINCENT, an English scholar, born in 1695; died in 1747. In 1721 after graduating as M.A. at Cambridge, he became a master in Westminster School, where he remained, so far as is known, to the end of his life. He is one of the few who have attained a kind of fame for writing Latin verse with a felicity and grace which might seem to rival those of the Roman poets themselves. His poems in Latin, which include original compositions and versions of English songs, epitaphs, etc., were first published in 1734. Cowper and Lamb translated various pieces of his.

Bournemouth (börn'muth), a watering-place in Hampshire, having one of the best beaches in England. It has a fine climate and beautiful scenery, and has greatly increased in population in recent years. Pop. (1911) 78,677.

Bournouse. See *Burnoose*.

Bourrienne (bör-rē-ān), FAUVELET DE, a French diplomatist, was born in 1769, and educated along with Bonaparte at the school of Brienne, where a close intimacy sprang up between them. Bourrienne went to Germany to study law and languages, but returning to Paris in 1792 renewed his friendship with Napoleon, from whom he

obtained various appointments, one of them that of minister plenipotentiary at Hamburg. His character suffered from his being involved in several dishonorable monetary transactions, yet he continued to fill high state offices and in 1814 was made prefect of police. On the abdication of Napoleon he paid his court to Louis XVIII, and was nominated a minister of state. The revolution of July, 1830, and the loss of his wealth affected him so much that he lost his reason, and died in a lunatic asylum in 1834. His *Mémoires sur Napoléon, le Directoire, le Consulat, l'Empire et la Restauration* are valuable.

Boussa (bō'sa), a kingdom of Gando, W. Sudan, on the Niger.

Boussingault (bō-sap-gō), JEAN BAPTISTE JOSEPH DIEU-DONNÉ, a French chemist, born at Paris in 1802; died in 1887. He went to South America in the employment of a mining company, and made extensive travels and valuable scientific researches there. Returning to France he became professor of chemistry at Lyons in 1839, was made a member of the Institute, and then made Paris his chief residence. His works deal chiefly with agricultural chemistry, and include *Economie Rurale* (translated into English and German), *Mémoires de Chimie agricole et de Physiologie*; *Agronomie*, *Chimie agricole et Physiologie*, etc.

Bouterwek (bō'ter-vek), a German author, born in 1706 died in 1828. He became a deep student of philosophy and literary history, his *History of Modern Poetry and Eloquence* (1801-19) being a work of high value the part which treats of Spanish poetry and eloquence being especially esteemed.

Bouts Rimés (bō rē-mā; French 'rhymed ends'), word or syllables given as the ends of the verses, the other parts of the lines to be supplied by the ingenuity of the poet. In the 17th century the composition of *bouts rimés* was a fashionable amusement.

Bout'well, GEORGE SEWALL, a statesman, born in Brookline, Massachusetts, in 1818. Soon after being admitted to the bar (1836) he entered politics as an Anti-Slavery Democrat. He was governor of Massachusetts 1851-3, and afterwards one of the organizers of the Republican party in that State. In 1863-9 he was in Congress, and was one of those conducting the impeachment of President Johnson. During Grant's first term he was Secretary of the Treasury, and subsequently (1873-7) a member of the Senate. He died Feb. 2, 1905.

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Bovidae

Bovidae (bov'i-dē), the ox family of animals, including the common ox, the bison, buffalo, yak, zebu, etc. They are hollow-horned, ruminant animals, generally of large size, with broad, hairless muzzles and stout limbs, and most of them have been domesticated.

Bovino (bō-vē'nō), a fortified town of South Italy, province of Foggia or Capitanata, 20 miles s. s. w. Foggia, the seat of a bishopric, suffragan to Benevento. Pop. 7613.

Bow (bō), the name of one of the most ancient and universal weapons of offense. Formerly made solely of wood, it is now of steel, wood, horn, or other elastic substance. The figure of the bow is nearly the same in all countries. The ancient Grecian bow was somewhat in the form of the letter E: in drawing it, the hand was brought back to the right breast, and not to the ear. The Scythian bow was nearly semicircular. The long-bow in medieval wars was the favorite national weapon in England. The battles of Crécy (1346), Poitiers (1356), and Agincourt (1415) were won by this weapon. It was made of yew, ash, etc., of the height of the archer, or about 6 feet long, the arrow being usually half the length of the bow. The arbalist, or crossbow, was a popular weapon with the Italians, and was introduced into England in the 13th century, but never was so popular as the long-bow. In England the strictest regulations were made to encourage and facilitate the use of the bow. Merchants were obliged to import a certain proportion of bow-staves with every cargo; town-councils had to provide public shooting butts near the town. Of the power of the bow, and the distance to which it will carry, some remarkable anecdotes are related. Thus Stuart (*Athenian Antiquities*, i) mentions a random shot of a Turk, which he found to be 584 yards. In the journal of King Edward VI it is mentioned that 100 archers of the king's guard shot at a 1-inch board, and that some of the arrows passed through this and into another board behind it, although the wood was extremely solid and firm. See *Archery*.

Bow, in music, is the name of that well-known implement by means of which the tone is produced from violins and other instruments of that kind. It is made of a thin staff of elastic wood, tapering slightly till it reaches the lower end, to which the hairs (about 80 or 100 horse-hairs) are fastened, and with which the bow is strung. At the upper end is an ornamental piece of wood or ivory called the *nut*, and fastened with a screw,

which serves to regulate the tension of the hairs.

Bow Bells, the peal of bells belonging to the church of St. Mary-le-Bow, Cheapside, London, and celebrated for centuries. One who is born 'within the sound of Bow Bells' is considered a genuine Jockney.

Bowdich (bou'dich), THOMAS EDWARD, an African traveler, born in 1790. In 1816 he led an embassy to the King of Ashantee, and afterwards published an account of his mission (1819). Having undertaken a second African expedition, he arrived at the river Gambia, where disease put an end to his life in 1824.

Bowditch (bou'ditch), NATHANIEL, an eminent mathematician, born at Salem, Massachusetts, in 1773. After serving as ship-chandler and as an officer on a merchant ship, he attracted attention in 1802 by his *The Practical Navigator*. He was afterwards connected with insurance companies, and (1820-38) performed the great work of translating Laplace's *Mécanique Céleste*, with a copious commentary which added greatly to its value. He died in 1838.

Bowdoin (bō'd'n), JAMES, born in 1727, at Boston, Massachusetts; died in 1790. He distinguished himself as an opponent of the policy of Britain; in 1785 was appointed governor of Massachusetts, and he was a member of the Constitutional Convention of 1787. He was a friend and correspondent of Franklin.—*Bowdoin College*, Brunswick, Maine, was named after him. It is a flourishing institution, which has had among its students Longfellow and Hawthorne.

Bowen (bō'en), FRANCIS, author, born at Charlestown, Massachusetts, in 1811. In 1853 he became professor of natural religion, moral philosophy and civil polity at Harvard University. He published *Lowell Lectures in the Application of Metaphysical and Ethical Science to the Evidences of Religion*, and *Principles of Political Economy applied to the Conditions of the American People*. He died in 1890.

Bower (bou'er), an anchor; so named from being carried at the bow of a ship. See *Anchor*.

Bower, ARCHIBALD, a Scottish writer, born in 1686, of Catholic parents. He was employed by the booksellers in conducting the *Historia Literaria*, a monthly review of books, and in writing a part of the *Universal History*, in sixty vols. 8vo. He also published a *History of the Popes* characterized by the utmost

seal against popery. He died a Protestant in 1766.

Bower-bird, a name given to certain Australian birds of the starling family from a remarkable habit they have of building bowers to serve as places of resort. The bowers are constructed on the ground, and usually under overhanging branches in the most retired parts of the forest. They are decorated with variegated feathers, shells, small pebbles, bones, etc. At each end there is an entrance left open. These bowers do not serve as nests at all, but seem to be places of amusement and resort, especially during the breeding season.—*The Satin Bower-bird* (*Ptilonorhynchus holosericeus*), is so called from its beautiful glossy plumage, which is of a black color. Another common species is the *Spotted Bower-bird*



Bower-bird (*Chlamydera maculata*) and its Run. (*Chlamydera maculata*), which is about 11 inches long, or rather smaller than the first mentioned, and less gay in color, but is the most lavish of all in decorating its bowers.

Bowie-knife, a long kind of knife like a dagger, but with only one edge, named after Colonel James Bowie, and formerly much used in America by hunters and others.

Bow Instruments, are all the instruments strung with catgut from which the tones are produced by means of the bow. The most usual are the double-bass (*violono* or *contrabasso*), the small bass, or *violoncello*, the tenor (*viola di braccio*), and the violin proper (*violino*). In reference to their construction the several parts are alike; the difference is in the size. See *Violin*.

Bowles (bōlz), WILLIAM LISLE, an English poet, was born in 1762 at King's Sutton, Northamptonshire, where his father was vicar; died in 1830. He was educated at Winchester and Oxford, where he gained high honors. In

1780 he composed a series of sonnets, by which the young minds of Coleridge and Wordsworth, then seeking for new and more natural chords in poetry, were powerfully affected. Having entered holy orders Bowles was, in 1805, presented to the living of Bremhill, in Wiltshire, where he continued to reside for the rest of his life. Besides the sonnets he published several poems (*The Spirit of Discovery*, *The Missionary of the Andes*, *St. John in Patmos*, etc.), which are characterized by graceful diction and tender sentiment rather than by any higher qualities.

Bowline (bō'lin), in ships, a rope leading forward, which is fastened by bridles to loops in the rope on the perpendicular edge of the square sails.

Bowling Green, capital of Warren Co., Kentucky, 17 miles N. by E. of Nashville at the head of navigation on Barren River, is an important shipping place. It has manufactures of tobacco, carriages, etc., and a large horse market. Pop. 9173.

Bowling Green, a city, capital of Wood Co., Ohio, 20 miles S. W. of Toledo. Oil is found largely near by, and it has various manufactures, including cut glass works, torpedo works, etc. Pop. 5222.

Bowls (bōls), BOWLING, an ancient British game, still extremely popular. It is played on a smooth, level piece of greensward, generally about 4 yards long, and surrounded by a trench or ditch about 6 inches in depth. A small white ball called the *jack* is placed at one end of the green, and the object of the players, who range themselves in sides at the other, is so to roll their bow that they may lie as near as possible to the jack. Each bowl is *biased* by being made slightly conical so as to give it a curvilinear direction; and in making the proper allowance for this bias, and in regulating the cast of the ball, consist the skill and attraction of the game. The side which owns the greatest number of bowls next the jack, gains the victory. See *Ten Pins*.

Bowman (bō'man), SIR WILLIAM, an English anatomist and surgeon, born in 1816; died in 1892. He was surgeon to King's College Hospital, London, and Professor of Physiology and Anatomy in King's College, and especially distinguished as an ophthalmic surgeon. He gained the Royal Society's royal medal for physiology in 1842. He was collaborator with Todd in the great work on the *Physiological Anatomy and Physiology of Man*, and wrote on op

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thalmology. He was created a baronet in 1884.

Bowring (bou'ring), SIR JOHN, an English statesman and linguist, born at Exeter in 1792, the son of a cloth manufacturer. While still very young he was taken by his father into his own business, and employed by him to travel in different parts of Europe. Having an extraordinary linguistic faculty he made use of his residence in foreign countries to acquire the different languages, and his first publications consisted of translations of poems and songs from the Russian, Servian, Polish, Magyar, Swedish, Frisian, Esthonian, Spanish, and other languages. He is well known also by his translations from Goethe, Schiller, and Heine. He was an ardent Radical and supporter of Jeremy Bentham, and edited the *Westminster Review* from 1825 to 1830. He held various government appointments, one of them being the governorship of Hong Kong, and the last being in 1861, when he was sent to Italy to report on British commercial relations with the new kingdom. He died Nov. 23, 1872.

Bowsprit (bô'sprit), the large boom or spar which projects over the stem of a vessel, having the foremast and foretopmast stays and staysails attached to it, while extending beyond it is the jib-boom.

Bowstring-hemp, the fiber of the leaves of an East Indian plant, or the plant itself, *Sansevieria seylanica*, order Liliaceae, so named from being made by the natives into bowstrings. The fiber is fine and silky, but very strong.

Bow-window, a window constructed so as to project from a wall, properly one that forms a segment of a circle. See *Bay-window*.

Bowyer (bô'yér), WILLIAM, an English printer and classical scholar, born 1699, a native of London, where his father, also a printer, carried on business. In 1729 he became printer of the votes of the House of Commons, and subsequently printer to the Society of Antiquarians and to the Royal Society. In 1767 he was nominated printer of the journals of the House of Lords and the rolls of the House of Commons. He died in 1777.

Box. See *Postree*.

Box-elder, the ash-leaved maple (*Negundo aceroides*), a small but beautiful tree of the United States, from which sugar is made. The wood is light and soft.

Boxer Rebellion

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was an uprising of the Chinese that grew out of the bitter anti-foreign sentiment aroused by the unseemly scramble of some of the European powers for the occupation of large areas of Chinese territory, euphemistically called 'spheres of influence,' which followed the war between China and Japan in 1894-95. Russia had seized Port Arthur and the harbor of Taheneran; Germany had 'leased' Kiaochau and acquired vast concessions in Shang Tung province; France desired certain privileges in Chinese territory adjacent to her possessions of Tonquin; and Great Britain had secured a lease of Wet-Hai-Wei, on the south shore of Pechili, commanding the entrance to the gulf and the waterway to Peking. Through the close interest of the United States in the affairs of the Far East, owing to the possession of the Philippine Islands, Secretary Hay procured in 1898, an agreement by the European powers concerned, guaranteeing equal rights of trade (the 'open door') in China to all powers, which moderated the active steps for the 'partition' of China, but the seeds of disorder had been sown and in 1900 the harvest was reaped in the outbreak directed first against the Christian missionaries and eventually against all Europeans, and the lives of the foreign ministers in Peking were imperilled.

Prince Tuan was the leader of the opposition to foreigners. He was an athlete and had many followers of athletic young Chinamen whose ability in sports led to their being known as Boxers. This name was adopted by Tuan's recruits. He proclaimed his nine-year-old son heir-presumptive to the throne. The emperor was but a puppet directed by the Dowager Empress and was not popular. The latter had not opposed the foreign encroachments. Finally the Boxers revolted. Reports of outrages and massacres and ignorance as to the fate of the legations decided the United States, British, French, German, Italian and Japanese governments to take concerted action and warships were hurried to China. The landing of marines at Tokio was stubbornly resisted and the vessels of the allied powers, except the United States, shelled the forts, and after a sanguinary encounter captured them on June 17th. United States troops were sent from Manila. On June 20th, the German Minister, Baron von Ketteler, was set upon and slaughtered by Chinese soldiers while on his way to the Tsung-li-Yamen, in Peking. Vice-admiral Seymour on the same day, was turned back while marching on Peking to relieve the British legation officials and suffered casualties of

374. The allied warships shelled Tien-Tsin on June 21st and on the 23d their combined forces occupied the foreign quarters of the city. On the same day Minister Wu, at Washington, requested an armistice on behalf of his government, in response to which the United States required that as a preliminary free communication be allowed with the legations at Peking. On July 13-14th the allied forces stormed the port of Tien-Tsin and captured it with a loss of 800 in killed and wounded. Five days later the Chinese Emperor solicited peace from President McKinley. The allied forces advanced upon Peking on August 4th under the command of Field Marshal von Waldersee, of the German army. The first word from the beleaguered foreigners was a message in cipher from United States Minister Conger, which, while reporting the safety of members of the legation, represented the appalling conditions prevailing and the imminent danger of the besieged foreigners. On August 8th Li Hung Chang was named Envoy Extraordinary to propose to the powers terms for the immediate cessation of hostile demonstrations. The allied forces captured Peking on August 14th, the Americans being the first to enter and furnishing the first victim in that city in Captain Reilly. Meantime the Emperor and the Dowager Empress had fled for safety. At once the besieged in the legations were relieved. On the 16th an armistice was refused and the United States rejected the appeal of Li Hung Chang and insisted on compliance with the demands it made. Full power to act was conferred on General Chaffee. The American refugees from Peking reached Tien-Tsin in safety on August 25th. Negotiations for terms of peace and compensation were carried on till December, when the conditions imposed by the allies were accepted by the Chinese government. The American cavalry and artillery evacuated Peking on May 5th. A formal indemnity of 450,000 taels (about \$300,000), in pursuance of the terms of settlement, was demanded by the powers on May, 9th which was agreed to by China, and on July 26th the powers agreed to the discharge of this sum by installments, the outstanding amount to bear interest at the rate of 4½ per cent. On September 17th, the occupying forces, United States and Japanese troops, restored the forbidden city to the Chinese. The liquidation of the indemnity payment is still in process (1917), and certain of the powers interested, including the United States and Great Britain, have agreed to postpone or forego the payments due them as a concession to China for her co-operation against Germany in the great war.

Box-hauling, the art of turning a ship when it is so situated that tacking is impossible. The operation is effected by hauling the head sheets to windward, bracing the head yards back and squaring the after-yards, the helm being put a-lee. *Boeing off* is a similar operation.

Boxing (boks'ing), or PUGILISM, fighting with the fist, an art somewhat common in all ages. The art of boxing consists in showing skill in dealing blows with the fist against one's opponent, especially on the upper part of the body while at the same time one protects one's self. In England professional boxers, who made a livelihood out of their skill in the art, were at one time common, especially during the reigns of the Georges, where persons of the highest rank were sometimes to be seen at pugilistic combats, and 'professors' of the art frequently had members of the nobility among their pupils. It had also a vogue in the United States, though little practised on the continent of Europe. At the gladiatorial shows of the Greeks and Romans boxing was common, but in a more dangerous form, the fist being armed with leather appliances loaded with iron or lead. Pugilistic encounters, however, have now fallen into disrepute, on account of their frequently brutal character, and laws have been passed for their suppression.

Boxing-day, the day after Christmas, which has long been held as a holiday in England. It is so called from the practice of giving Christmas boxes as presents on that day.

Boxing the Compass, in seamen's phrase, the repetition of all the points of the compass in their proper order—an accomplishment required to be attained by all sailors.

Box-tortoise, a name given to one of two North American tortoises, genus *Cistudo*, that can completely shut themselves into their shell.

Boxtree (*Buxus sempervirens*), a shrubby evergreen tree, 10 or 15 feet high, order Euphorbiaceae, native of Southern Europe, and parts of Asia, with small oval and opposite leaves and greenish, inconspicuous flowers, male and female on the same tree. It was formerly so common in England as to have given its name to several places—Boxhill, in Surrey, for instance, and Boxley, in Kent. The wood is of a yellowish color, close-grained, very hard and heavy and admits of a beautiful polish. On these accounts it is much used by turners, wood-carvers, engravers on wood (the wood surpassing it for this purpose), and

Boycott

Boyesen

mathematical-instrument makers. Flutes and other wind-instruments are formed of it. The box of commerce comes mainly from the regions adjoining the Black Sea and Caspian, and is said to be diminishing in quantity. In gardens and shrubberies box-trees may often be seen clipped into various formal shapes. There is also a dwarf variety reared as an edging for garden walks and the like.

Boycott. See *Danbury Hatters' Case*.

The United States Supreme Court in handing down its decision in regard to this case in 1908 declared (1) that the Sherman Anti-Trust Act is violated when labor organizations become a conspiracy in restraint of trade; and (2) that individual members of the union can be held liable for damages of three times the amount of the actual loss inflicted, costs and attorney's fees, in case civil action is taken. Laws prohibiting boycotting have been enacted in Arkansas, Colorado, Illinois, Indiana, and Texas. Blacklisting is prohibited in 26 States. Intimidation conspiracy against workmen and interference with employment are prohibited by laws in 33 States. In 18 States employers are forbidden to exact an agreement from an employee, either verbal or written, not to become a member of a labor organization as a condition to his obtaining employment. In Great Britain boycotting is lawful if not accompanied by violence and if it serves the purpose of improving working conditions.

Boycotting (boi'kot-ing), the term is defined by Bouvier: 'A confederation, generally secret, of many persons, whose intent is to injure another by preventing any and all persons from doing business with him through fear of incurring the displeasure, persecution, and vengeance of the conspirators.' The practice had its origin in Ireland during the land troubles of 1880 and 1881. It takes its name from a Captain James Boycott, a Mayo land agent, against whom it was first directed.

The boycott is of particular interest to Americans owing to its connection with the American Federation of Labor, which applied it notably in the strike of the Danbury (Conn.) hatters in 1902. The boycott was both primary and secondary, and it was in this latter application of its power that the American Federation of Labor was allied with it. By this organization it was spread over the country, and thus the labor body came into contact with the Federal authorities, its action being construed under the provisions of the Sherman Law as a combination to restrict inter-state commerce; and this was the view of the supreme

court in its decision handed down in the Danbury hat case.

Another illustration of the secondary boycott is given in the case of the Buck's Stove and Range Company vs. the American Federation of Labor, in which proceedings were begun to enjoin the boycott against the Buck's Stove and Range Company, and later, proceedings to enforce the injunction, by holding the defendants in contempt of court for violating the injunction. The history of this case is briefly as follows: In March, 1907, the American Federation of Labor pronounced a boycott against the stove company, publishing its name in the 'unfair' list and in the 'we don't patronize' list of its official organ. It took apparently effective means to prevent tradesmen from buying the Buck's product and also to prevent individuals from patronizing tradesmen who dealt in the Buck's output.

Boydell (boi'del), JOHN, an English engraver, but chiefly distinguished as an encourager of the fine arts. With the profits of a volume of engravings executed by himself, and published in 1746, he set up as a printseller, and soon established a high reputation as a liberal patron of good artists, with the result that for the first time English prints began to be exported to the Continent. He engaged Reynolds, Opie, West, and other celebrated painters to illustrate Shakespeare's works, and from their pictures was produced a magnificent volume of plates, the *Shakespeare Gallery* (London, Boydell, 1803). He died in 1804.

Boyer (bwä-yä), ALEXIS, a French surgeon, born 1757; died 1833. He had a brilliant career as a student, and was appointed first surgeon to Napoleon, receiving at the same time the title of Baron of the Empire.

Boyer (bwä-yä), JEAN PIERRE, president of the Republic of Hayti, born in 1776 at Port-au-Prince; died at Paris in 1850. He was a mulatto by birth, but was educated in France. In 1792 he entered the French army, and fought with distinction against the English in San Domingo. It was largely by his efforts that in 1821 all parts of Hayti were brought under one republican government, of which he was chosen president. His administration in its earlier years was wise and energetic, but in 1843 he was driven into exile by a revolt.

Boyesen (boi'e-sen), HJALMAR HJORTH, novelist, born at Frederiksværn, Norway, in 1848; died in 1895. He came to the United States in 1869, and was professor of language successively in Urbana University, Cornell University,

and Columbia College. His works, written in English, are *Gunnar*, *Falconberg*, *Ilka on the Hill Top*, *Queen Titania*, *Boyle* (boil), a town of Ireland, County Roscommon, with a large trade in corn and butter. Boyle Abbey, now in ruins, dates from the twelfth century. Pop. about 2500.

Boyle, CHARLES, Earl of Orrery, born 1676; died 1731, was nominally the editor of the edition of the *Epistles of Phalaris*, which led to a famous controversy with Bentley (see Bentley), and to Swift's *Battle of the Books*. He served in the army and as a diplomat. The astronomical apparatus called the orrery took its name from him.

Boyle, JOHN J., a sculptor, born in New York in 1857. Among his notable works are a seated statue of Benjamin Franklin before the post-office at Philadelphia and several striking conceptions of the American aborigines.

Boyle, RICHARD, Earl of Cork, an English statesman, was born in 1566. In 1588 he went to Dublin with little or no money, but with good recommendations, and by prudence and ability he managed to acquire considerable estates. As a clerk of the Council of Munster he distinguished himself by his talents and activity, and became successively a knight and privy-councilor, Baron Boyle of Youghal, Viscount Dungarvan and Earl of Cork. He died in 1643.

Boyle, ROBERT, a celebrated natural philosopher, was born at Lisamore, Ireland, 1626, and was the seventh son of Richard the first earl of Cork. After finishing his studies at Eton he traveled for some years on the Continent till, in 1644, he settled in the manor of Stalbridge, Dorsetshire, which his father had left him. Here he devoted himself to scientific studies, to chemistry and natural philosophy in particular. He was one of the first members of the society founded in 1645, afterwards known as the Royal Society. At Oxford, to which he had gone in 1652, he occupied himself in making improvements on the air-pump, by means of which he demonstrated the elasticity of air. Although his scientific work shows an accurate, minute, and methodical intellect, in religious matters he was subject to melancholy and fanciful terrors. With the view of settling his faith he began the study of those oriental languages which contain the origins of Christianity, and formed connections with such eminent scholars as Pococke, Clarke, Barlow, etc. He also instituted public lectures, known as the Boyle Lectures, for proving the Christian religion against

Atheists, Deists, Pagans, Jews, and Mohammedans, not descending to any controversy amongst Christians themselves. The first series was delivered by Richard Bentley. Samuel Clarke, Whiston, and F. D. Maurice were among succeeding Boyle lecturers. Boyle died in 1691, and was interred in Westminster Abbey.

Boyle, ROGER, Earl of Orrery, brother of Robert Boyle, born in 1621, died in 1679. In Ireland he zealously supported the cause of Charles I, but after the death of the king he retired for a time from public life. At length he accepted a commission from Cromwell, whom he served with zeal and fidelity, and by whom he was highly esteemed. On the death of Cromwell he exerted himself with such dexterity to bring about the royal restoration that Charles II rewarded him with the title of Earl of Orrery.

Boyle Lectures. See Boyle, Robert.

Boyle's Law, otherwise called *Mariotte's Law*, a law in physics to the effect that the volume of a gas will vary inversely to the pressure to which it is subjected, and the density and elastic force are directly as the pressure and inversely as the volume.

Boyne (boin), a river of Ireland, which rises in the Bog of Allen, and after a course of 60 miles falls into the Irish Sea 4 miles from Drogheda. It is navigable for barges to Navan, 19 miles from its mouth. Much of its course is marked by fine scenery. About 2 miles west of Drogheda, an obelisk 130 ft. high marks the spot where was fought the battle between the adherents of James II and William III in 1690, in which the latter proved victorious, James being obliged to flee to the continent.

Boy Scouts, an organization for the physical and moral improvement of boys, its purpose being to train boys of a proper age in athletic outdoor exercises and also in courtesy and helpfulness to others. This name was given the organization in 1908 by Lieutenant-General Baden-Powell of the British army, but the idea originated with Ernest Thompson Seton, of Connecticut, about ten years earlier, who organized the boys of his vicinity into an association which he called the 'Seton Indians,' giving them the privilege of using his large and well-wooded estate for the purpose of training them in the arts of woodcraft practised by the American Indians, such as following the trail, canoeing, camping out, etc. A sort of tribal organization was formed and exercises

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arranged to train the senses and develop powers of endurance in his youthful pupils; efforts also being made to arouse in them sentiments of self-help, self-control, courtesy, honor, obedience to superiors, and ready aid to all in need of assistance. Daniel C. Beard, of Flushing, N. Y., a well-known artist and author in outdoor subjects, followed with the 'Sons of Daniel Boone,' described in his *Boy Pioneers and Sons of Daniel Boone* (1909). The introduction of the organization in England was due to Mr. Seton, who, in 1906 interested General Baden-Powell in the work to such an extent that he resigned from the army and engaged in this new field of activity with such enthusiasm that the system rapidly spread through the British islands. The Boy Scouts there were taught the methods of scouting practised in the army and trained in military discipline, conditions not introduced in the American organizations. This British development of the idea and its new name gave it a wide popularity, Boy Scout groups being formed in many parts of the United States and in several European and South American countries, until a million and more of youthful devotees were enlisted in the work.

In the exercises of the Boy Scouts no idea of competition is encouraged and no rewards are given for superiority in contests of skill; but ability to perform certain severe duties, demanding skill, readiness, sagacity, powers of endurance, quickness of observation, alertness in emergencies, etc., win them certain coveted distinctions. To develop in them desirable mental and moral sentiments they are required to take certain vows, such as: 'Not to rebel'; 'Not to leave a camp-fire without some one to watch it'; 'To protect the song birds, not to disturb their nests or eggs, or to molest squirrels'; 'Not to make a dirty camp, bring firearms into a camp of those under fourteen, or point a weapon at any one'; 'To keep the game laws'; 'Not to smoke' (if under eighteen); 'Not to bring firewater into camp'; 'To play fair'; 'To keep their word of honor sacred,' together with general rules of honor, duty, obedience, loyalty, courtesy, thrift, friendliness, pleasantness of manner, kindness to animals, the performance of some act of friendly aid to others daily, etc. The fact that their training covers such a scope made them prominent as an incipient military body during the European War, and in 1917 a large sum of money was raised by public subscription to aid them in their useful activities.

Bozrah (bos'ra), an ancient city of Palestine, east of the Jordan, and about 80 miles south of Damascus. It was the capital of Og, King of Bashan, and subsequently belonged to the tribe of Manasseh. Early in the Christian era it became a flourishing place, and was long a great emporium of trade. It is now a scene of ruins.

Bozzaris (bot-sa'ris), MARKO, a hero of the Greek war of independence against the Turks, born about the end of the eighteenth century. After the fall of Suli he retired to the Ionian Islands, from whence he made a vain attempt to deliver his native country. In 1820, when the Turks were trying to reduce their overgrown vassal, Ali Pasha of Janina, to submission, the latter sought aid from the exiled Suliotes, and Marko Bozzaris returned to Epirus. On the outbreak of the war of independence he at once joined the Greek cause, and distinguished himself as much by his patriotism and disinterestedness as by his military skill and personal bravery. In the summer of 1823, when he held the command-in-chief of the Greek forces at Missolonghi, he made a daring night attack on the camp of the Pasha of Scutari, near Karpenisi. The attack was successful; but the triumph of the Greeks was clouded by the fall of the heroic Bozzaris. His deeds are celebrated in the popular songs of Greece.

Bra (brä), a town in North Italy, province of Cuneo, with a trade in cattle, grain, wine and silk. Pop. 11,482.

Brabançonne (brä-ban-son'), the national song of the Belgians, written during the revolution of 1830 by Jenneval, an actor at the theater of Brussels, and set to music by Campenhout.

Brabant (brä-bant' or bra'bant), the central district of the lowlands of Holland and Belgium, extending from the Waal to the sources of the Dyle, and from the Meuse and Limburg plains to the lower Scheldt. It is divided between the kingdoms of Holland and Belgium, into three provinces: 1st, Dutch or North Brabant, area 1977 sq. m.; 2d, Belgian province of Antwerp, area of 1095 sq. m.; and 3d, the Belgian province of South Brabant, area 1276 sq. m. The country is generally a plain, gently sloping to the N. W., and is mainly fertile and well cultivated, agriculture and the rearing of cattle being the principal employment of the inhabitants. In the north the inhabitants are Dutch; in the middle district, Flemings; in the south Walloons. Southward of Brussels the language is French; northward, Dutch and Flemish. In the

5th century Brabant came into possession of the Franks, and after being alternately included in and separated from Lorraine it emerged at length in 1190 as a duchy under a Duke of Brabant. It eventually came by marriage into possession of the Dukes of Burgundy, and passed with the last representative of that line, Mary of Burgundy, to the house of Austria, and finally to Philip II of Spain. In the famous revolt of the Netherlands, caused by the cruelties of King Philip and his agent, the Duke of Alva, North Brabant succeeded in asserting its independence, and in 1648 it was incorporated with the United Provinces. South Brabant remained, however, in possession of the Spaniards, and at the peace of Utrecht in 1714 passed again, along with the other southern provinces of the Netherlands, to the imperial house of Austria. See *Belgium*.

Brace (brās), CHARLES LORING, author and philanthropist, born at Litchfield, Connecticut, in 1826; died in 1890. He studied theology and in New York took up the question of the education and housing of the poor. He founded the Children's Aid Society in 1853 and acted as its secretary. Through it homes have been found for many thousands of children. He wrote the *Races of the Old World*, *Gesta Christi*, works of travel, etc.

Bracelet (brās'let), a kind of ornament usually worn on the wrist, the use of which extends from the most ancient times down to the present, and belongs to all countries, civilized as well as uncivilized. Bracelets were in use in Egypt and amongst the Medes and Persians at a very remote period, and in the Bible the bracelet is frequently mentioned as an ornament in use among the Jews, both men and women. Among the ancient Greeks bracelets seem to have been worn only by the women. The spiral form was preferred, and very often made to assume the appearance of snakes, which went round the arm twice or thrice. Among the Romans it was a frequent practice for a general to bestow bracelets on soldiers who had distinguished themselves by their valor. Roman ladies of high rank frequently wore them both on the wrist and on the upper arm. Among the ancient heathen Germanic tribes they formed the chief and almost only ornament, as is shown by their being so often found in old graves. They seem to have been used by the men even more than by the women, and were the gifts by which an ancient German chief attached his followers to himself. So, in old Anglo-Saxon poems, 'ring-giver'

is a common name for the lord or ruler.

Braces (brā'ses), in ships, ropes passing through blocks at the ends of the yards, used for swinging the latter round so as to meet the wind in any desired direction.

Brachiopoda (bra-ki-op'o-da), a class of shell-bearing animals having affinities with the worms and the polyzoa, but less with the mollusca, though their bivalve shells give them an outward resemblance to the lamelli-branchiata. Their name comes from the development of a long spirally-coiled, fringed appendage or arm on either side of the mouth (Gr. *brachion*, an arm, and *pous*, *podos*, a foot), serving as respiratory organs. They have no proper power of locomotion, and remain fixed to submarine bodies, in some cases by a peduncle passing through an aperture at the 'beak.' They are widely diffused, and in the fossil state are interesting to the geologist by enabling him to identify certain strata. They were vastly more abundant in the early geological ages than at present, especially in Silurian and Devonian times, and again became numerous in the Chalk period, then decreasing to the present time. The chief genera are *Lingula*, *Terebatula*, and *Rhynchonella*.

Brachycephalic (bra-ki-se-fal'ik; Gr. *brachys*, short, *kephalē*, the head), a term applied in ethnology to heads whose diameter from side to side is not much less than from front to back, as markedly occurs in the Mongolian type: opposed to *dolichocephalic*.

Brachypterae (bra-kipt'e-rē; 'short-winged'), a name given to a family of web-footed birds, penguins, auks, divers, guillemots, etc., in which the wings are short and the legs placed far back in the body. They are all strong divers and swimmers.

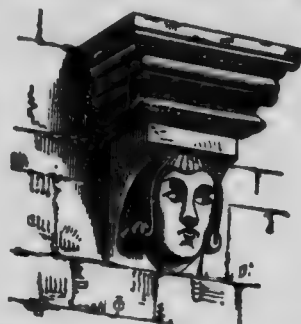
Brachyura (bra-ki-ŭ'ra; 'short-tailed'), a section of the ten-footed crustaceans or crabs (*Decapoda*), having a very short jointed tail folded closely under the thorax as in the common crab.

Bracken, *Brake*, *Pteris aquilina*, a species of fern very common in America and Europe, and often covering large areas on hillsides and waste grounds. It has a black creeping rhizome, with branched pinnate fronds growing often to the height of several feet, and it forms an excellent covert for game. The rhizome is bitter, but has been eaten in times of famine. The plant is strigent and anthelmintic; when burned it yields a great deal of alkali. The rhizome of *Pteris esculenta*, a native of New

Bracket

Zealand, was formerly a staple article of food among the Maories.

Bracket, a short piece or combination of pieces, generally more or less triangular in outline, and projecting



Bracket, Harlestone Church, Northamptonshire.

from a wall or other surface. They may be either of an ornamental order, as when

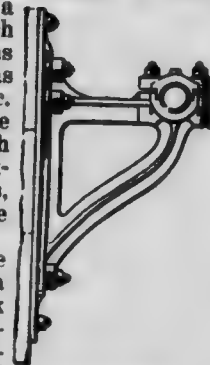
designed to support a statue, a bust, or such like, or plain forms of carpentry, such as support shelves, etc. Brackets may also be used in connection with machinery, being attached to walls, beams, etc., to support a line of shafting.

Bract, a leaf from the axil of which a flower or flower-stalk proceeds, thus distinguished from the ordinary leaf, from the axil of which the leaf-bud proceeds. It differs from other leaves in shape or color, and is generally situated on the peduncle near the flower. It is sometimes called also the floral leaf.

Bracteates (brak'te-atz), old thin coins of gold or silver, with irregular figures on them, stamped upon one surface only, so that the impression appears raised on one side while the other appears hollow.—*Bracteated* coins, coins of iron, copper, or brass, covered over with a thin plate of some richer metal, such as gold or silver.

Bracton (brak'ton), HENRY DE, one of the earliest writers on English law, flourished in the 13th century. He studied law at Oxford, became a judge, and afterwards chief justice of England. His principal work is entitled *De Consuetudinibus et Legibus Angliæ*.

Braddock (brad'dok), a borough of Allegheny Co., Pennsylv-



Wall-bracket.

vania, 10 miles s. e. of Pittsburgh, at the location of Braddock's defeat (see following article). Here is one of the largest steel plants of the country and manufactures having to do with rail-roading. Pop. 19,357.

Braddock, EDWARD, major-general and commander of the British and colonial forces in the expedition against the French on the river Ohio, in 1755. In the spring of that year he set out from Virginia to invest Fort Duquesne, on the site of the present Pittsburgh, but from want of caution, and in disregard of the advice of Washington, who accompanied him, he fell into an Indian ambuscade by which he lost nearly one-half of his troops and received himself a mortal wound.

Braddon (brad'on), MARY ELIZABETH, a well-known novelist, born in London in 1837, and daughter of a solicitor there. After publishing some poems and tales, in 1862 she brought out *Lady Audley's Secret*, the first of a series of clever sensational novels. She also wrote poems and became the editor of the London magazine *Belgravia*. D. 1915.

Bradford (brad'furd), a municipal and parl. borough and important manufacturing town in West Riding of Yorkshire, England. The more modern portion has well-built streets, and since 1861 extensive street improvements have been carried out. There is a large number of scientific, educational, and charitable institutions, amongst which may be mentioned the new technical college, the free grammar school endowed by Charles II, the fever hospital, built at a great cost, and the warehouses of the Tradesmen's Benevolent Society. There are several public parks, and an extensive system of water-works. Bradford is the chief seat in England of the spinning and weaving of worsted yarn and woollens. Pop. (1911) 288,505.

Bradford, a city of McKean County, Pennsylvania, 78 miles s. of Buffalo. It is the center of an extensive oil district, and has large oil interests, pipe lines to the seaboard, and numerous manufactures, including oxalic acid. Pop. 14,544.

Bradford-on-Avon, or Great Bradford, an ancient town of England, in Wiltshire, 28 miles n. w. of Salisbury, beautifully situated on the banks of the Lower Avon. Pop. 4501.

Bradlaugh (brad'la), CHARLES, secularist, atheist, and advocate of republicanism, born at London in 1833. Being elected to Parliament for Northampton in 1880, he claimed the right to make affirmation simply, instead

of taking the oath which members of parliament take before they can sit and vote, but being a professed atheist this right was denied him. Though he was repeatedly re-elected by the same constituency, the majority of the House of Commons continued to declare him disqualified for taking the oath or affirming; and it was only after the election of a new parliament in 1885 that he was allowed to take his seat without opposition as a representative of Northampton. He was editor of the *National Reformer*. Died in 1891.

Bradley (brad'li), JAMES, astronomer, born at Sherborne, England, in 1692. He studied theology at Oxford, and took orders; but devoting himself to astronomy, he was appointed, in 1721, professor of that science at Oxford. Six years afterwards he made known his discovery of the aberration of light, and his researches for many years were chiefly directed towards finding out methods for determining precisely the quantity of aberration. It is largely owing to Bradley's discoveries that astronomers have since been able to make up astronomical tables with the necessary accuracy. In 1741 he was made astronomer-royal, and removed to Greenwich. He died in 1762. His *Astronomical Observations* were published at Oxford in 1805.

Bradshaw (brad'sha), JOHN, president of the High Court of Justice which tried and condemned Charles I of England. He studied law at Gray's Inn and attained a fair practice. When the king's trial was determined upon, Bradshaw was appointed president of the court; and his stern and unbending deportment at the trial did not disappoint expectation. Afterwards he opposed Cromwell and the Protectorate, and was in consequence deprived of the chief justiceship of Chester. On the death of Cromwell he became lord-president of the council and died in 1659. At the Restoration his body was exhumed and hung on a gibbet with those of Cromwell and Ireton.

Bradshaw's Railway Guide,

a well-known English manual for travelers, first issued by a George Bradshaw, a printer and engraver of Manchester, in 1839. It is now published on the 1st of each month, and contains the latest arrangements of railway and steamboat companies, besides other useful information. There are now many such handbooks in the field, and the idea has since been further developed in the descriptive handbooks of Murray, Baedeker, and others.

Bradwardin (brad-wär'din), THOMAS, Doctor Profundus, Archbishop of Canterbury, born about 1290; died in 1349. He was distinguished for his varied learning, and more particularly for his treatise *De Causa Dei contra Pelagium*, an extensive work against the Pelagian heresy, for centuries a standard authority. He was chaplain and confessor to Edward III, whom he accompanied to France, being present at Crécy and the capture of Calais. Being appointed archbishop, he hastened to England, but died of the black death on reaching London.

Brady, CYRUS TOWNSEND, clergyman and author, was born in Allegheny, Pa., in 1861. After being in railroad service he became a clergyman of the P. E. Church, holding various posts, including that of assistant minister of St. Stephen's Church, New York, in 1914. His literary labor began in 1899 and includes very many tales of romance and adventure. He wrote also numerous works dealing with romantic and legendary historical subjects.

Brady (brä'di), JAMES T., an eminent lawyer of New York, born in 1815; died in 1869. He became distinguished as counsel for the defense in criminal cases and during the Civil war was a leader of the party known as 'Wall Democrats.'

Brad'ypus. See *Sloth*.

Braemar (brä'mar), a Highland district in the s. w. corner of Aberdeenshire. It contains part of the Grampian range with the heights of Ben Macdhuil, Cairntoul, Lochnagar, etc. The district has some fine scenery, valleys and hillsides covered with birch and fir, but consists mostly of uncultivated heaths.

Braga (brä'gä), THEOPHILO, historian, poet, and President of Portugal, was born on the island of São Miguel in the Azores, in 1843. His poetical powers developed early and at 16 he published a collection of sentimental verses, *Folhas Verdes* ('Green Leaves'). He studied law, but continued to write, publishing in 1864 a long epic poem, *Vision of the Ages*. In 1872 he became professor of modern languages in the Curso Superior de Lettres in Lisbon, and here began his great work, *History of Portuguese Literature*, of which 32 volumes have been published. Other works are *Universal History*, *System of Sociology*, *Outline of Positivistic Philosophy*, etc. On the overthrow of the monarchy in Portugal, October, 1910, he, although without experience in political life, was chosen

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president of the new republic, a position which he filled with credit until the election of a new president in 1911.

Braga (brá'gá), an ancient town in Northern Portugal, the seat of an archbishop who is Primate of Portugal, charmingly situated on a rising ground and surrounded by walls flanked with towers, and with suburbs outside. It contains an archiepiscopal palace, and a richly ornamented Gothic cathedral of the 13th century, and is a place of considerable trade and manufactures. There still exist remains of a Roman temple, amphitheater, and aqueduct. Pop. 24,309.

Braganza (brá-gán'zá), or BRAGAN'ÇA, a town of Portugal, capital of the former province Trás-os-montes, with a castle, the ancient seat of the Dukes of Braganza, from whom the late reigning family of Portugal are descended. Pop. 5476. Brazil has two towns of the same name, one in the state of Para, with 17,000 pop. in town and district; the other in Sao Paulo, with sugar mills, in a cattle-raising district. Pop. 10,000.

Bragg, BRAXTON, soldier, born in North Carolina in 1817. He graduated at West Point in 1837, served in the artillery through the Seminole and Mexican wars, and retired from the army in 1856 with the rank of lieutenant-colonel. He joined the Confederate army in the civil war as brigadier-general, being promoted major-general in 1862. He commanded a corps at the battle of Shiloh, was promoted general, invaded Kentucky and fought General Buell at Perryville; was defeated by Rosecrans at Stone River, but subsequently defeated Rosecrans at Chickamauga. Grant defeated him in a great battle at Missionary Ridge, in November, 1863, and in December he was relieved from his command. Died in 1876.

Braham (brá'am), JOHN, a celebrated tenor singer, of Jewish extraction, was born in London in 1774. He appeared with the greatest success on the leading stages of France, Italy, and the United States, as well as in his own country. He excelled mainly in national songs, such as the *Bay of Biscay*, *O*, and *The Death of Nelson*, and continued to attract large audiences even when eighty years old. He died in 1856.

Brahe (brü'a), TYCHO, a Danish astronomer, born in 1546 of a noble family; died in 1601. He studied law at Copenhagen and Leipzig, but from 1565 gave himself up to astronomy, and in 1580 built an observatory on the island of Hveen in the Sound, providing it with

the best instruments then procurable. Here he developed the planetary systems associated with his name, the earth, by his theory, being regarded as the center of the heavenly bodies. After the death of his patron, Frederick II of Denmark, he left his native country in 1597 and went to Germany. Here he was patronized by the Emperor Rudolph, who gave him a yearly allowance and a residence at Prague, where he died. His astronomical works were all written in Latin. He is chiefly notable for his services to practical astronomy, his observations being superior in accuracy to those of his predecessors.

Brahilow. See *Braila*.

Brahma (brá'ma), a Sanskrit word signifying (in its neuter form) the Universal Power or ground of all existence, and also (in its masculine form with long final syllable) a particular deity, the first person in the Triad (Brahmā, Vishnu, and Siva) of the



Brahma—Bronze, Indian Museum.

Hindus. The personal god Brahmā is represented as a red or golden-colored figure with four heads and as many arms, and he is often accompanied by the swan or goose. He is the god of the fates, master of life and death, yet he is himself created, and is merely the agent of Brahmā, the Universal Power.

Brahmanism (brá'man-izm), the religious and social system of the Hindus, so called because it has been developed and expounded by the sacerdotal caste known as the Brahmins (from *brahman*, 'a potent prayer'; from root *brih* or *vrih*, 'to increase'). It is founded on the ancient religious writings known as the Vedas and regarded as sacred revelations, of which the Brah

mans as a body became the custodians and interpreters, being also the officiating priests and the general directors of sacrifices and religious rites. As the priestly caste increased in numbers and power they went on elaborating the ceremonies, and added to the Vedas other writings tending to confirm the pretensions of this now predominant caste, and give them the sanction of a revelation. The earliest supplements to the Vedas are the Brahmanas, more fully explaining the functions of the officiating priests. Both together form the revealed Scriptures of the Hindus. In time the caste of Brahman came to be accepted as a divine institution, and an elaborate system of rules defining and enforcing by the severest penalties its place as well as that of the inferior castes was promulgated. Other early castes were the Kshatriyas or warriors, and the Vaisyas or cultivators, and it was not without a struggle that the former acknowledged the superiority of the Brahman. It was by the Brahman that the Sanskrit literature was developed; and they were not only the priests, theologians, and philosophers, but also the poets, men of science, lawgivers, administrators, and statesmen of the Aryans of India.

The sanctity and inviolability of a Brahman, as given in the priestly code, are maintained by severe penalties. The murder of one of the order, robbing him, etc., are inextinguishable sins; even the killing of his cow can only be expiated by a painful penance. A Brahman should pass through four states: First, as Brahmachari, or novice, he begins the study of the sacred Vedas, and is initiated into the privileges and the duties of his caste. He has a right to alms, to exemption from taxes, and from capital and even corporal punishment. Flesh and eggs he is not allowed to eat. Leather, skins of animals, and most animals themselves are impure and not to be touched by him. When manhood comes he ought to marry, and as Grihastha enter the second state, which requires more numerous and minute observances. When he has begotten a son and trained him up for the holy calling he ought to enter the third state, and as Vanaprastha, or inhabitant of the forest, retire from the world for solitary praying and meditation, with severe penances to purify the spirit; but this and the fourth or last state of a Sannyasi, requiring a cruel degree of asceticism, are now seldom reached, and the whole scheme is to be regarded as representing rather the Brahmanical ideal of life than the actual facts.

The worship represented in the oldest

Vedic literature is that of natural objects: the sky, personified in the god Indra; the dawn, in Ushas; the various attributes of the sun, in Vishnu, Surya, Agni, etc. These gods were invoked for assistance in the common affairs of life, and were propitiated by offerings which, at first few and simple, afterwards became more complicated and included animal sacrifices. In the later Vedic hymns, the gradual development of a philosophical conception of religion and the problems of being and creation appears, leading to the supplements and commentaries known as the Brahmanas and the Upanishads. In some of the Upanishads the deities of the old Vedic creed are treated as symbolical. Brahman, the supreme soul, i. e. the only reality, the world is regarded as an emanation from him, and the highest good of the soul is to become united with the divine. The necessity for the purification of the soul in order to permit its reunion with the divine nature gave rise to the doctrine of metempsychosis or transmigration.

This philosophical development of Brahmanism was accompanied by a distinct separation between the educated and the vulgar creeds. Whilst from the fifth to the first century B.C. the highest thinkers amongst the Brahman were developing a philosophy which recognized that there was but one god, the popular creed had concentrated its idea of worship round three great deities—Brahma, Vishnu, and Siva, who now took the place of the confused old Vedic Pantheon. Brahmā, the creator, though considered the most exalted of the three, was too abstract an idea to become a popular god, and soon sank almost out of notice. Thus the Brahman theology became divided between Vishnu, the preserver, and Siva, the destroyer and reproducer, and the worshipers of these two deities now form the two great religious sects of India. Siva, in his philosophical significance, is the deity chiefly worshiped by the conventional Brahman, while in his aspect of the Destroyer, or in one of his female manifestations, he is the god of the low castes, and often worshiped with degrading rites. But the highly cultivated Brahman is still a pure theist, and the educated Hindu in general professes to regard the special deity he chooses for worship as merely a form under which the One First Cause may be approached.

The sharp division of the people of India into civilized Aryans and rude non-Aryans has had a great influence upon Brahmanism, and thus the spiritual conceptions of the old Vedic creed have been

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Brahmaputra

mixed in modern Hinduism with degrad-
ing superstitions and customs belonging
to the so-called aboriginal races. Suttee,
for example, or the burning of widows,
has no authority in the Veda, but like
most of the darker features of Hinduism
is the result of a compromise which the
Brahmanical teachers had to make with
the barbarous conceptions of non-Aryan
races in India. The Buddhist religion
has also had an important influence on
the Brahmanic, from which it differs less
philosophically than ethically.

The system of caste originally no doubt
represented distinctions of race. The
early classification of the people was that
of 'twice-born' Aryans (priests, war-
riors, husbandmen) and once-born non-
Aryans (serfs); but intermarriages,
giving rise to a mixed progeny, and the
variety of employments in modern times,
have profoundly modified this simple
classification. Innumerable minor dis-
tinctions have grown up; so that amongst
the Brahmins alone there are several
hundred castes who cannot intermarry or
eat food cooked by each other.

The Brahmins represent the highest
culture of India, and as the result of
centuries of education and self-restraint
have evolved a type of man distinctly
superior to the castes around them. They
have still great influence, though many
are driven into employments inconsistent
with the character of their caste.

Brahmaputra (brā-m-a-pū'tra), a
large river of Asia,
whose sources, not yet explored, are sit-
uated near Lake Manasarovora, in Tibet,
near those of the Indus. In Tibet,
where it is called the Sanpoo, it flows
eastwards north of the Himalayas, and,
after taking a sharp bend and passing
through these mountains, it emerges in
the northeast of Assam as the Dihong;
a little farther on it is joined by the
Dibong and the Lohit, when the united
stream takes the name of Brahmaputra,
literally the son of Brahma. After en-
tering Bengal it joins the Ganges at
Goalanda, and further on the Meghna,
and their united waters flow into the
Bay of Bengal. The Brahmaputra is
navigable by steamers for about 800
miles from the sea, its total length being,
perhaps, 1800 miles.

Brahmo-Somaj (brā'mo-sō'maj), or
the Theistic Church
of India, was founded in 1830 by an en-
lightened Brahman, Rammohun Roy,
who sought to purify his religion from
impurities and idolatries. This church,
while accepting what religious truth the
Vedas are admitted to contain, rejects
the idea of their special infallibility, and

Brain

founds its faith on principles of reason.
It has had a large and promising
development, and doubtless has been
strongly affected by the spread of Eng-
lish education among the Hindus. The
members do not in principle recognize
the distinction of caste, and have made
great efforts to weaken this as well as
other prejudices amongst their country-
men.

Brahms (brāms), JOHANNES, a noted
German composer, born at
Hamburg, 1833; died at Vienna, 1897.
He wrote in practically every branch ex-
cept the dramatic, but his symphonies
are most representative.

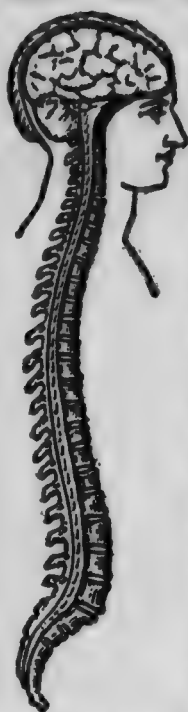
Braïla (brā'e-lā or brā-e'lā), a town in
Roumania, formerly a fortress,
on the left bank of the Danube, which
divides itself here into a number of arms,
one of them forming the harbor of the
town. The exportation of grain and the
sturgeon fisheries are amongst the princi-
pal industries in Braïla. Pop. 58,392.

Braille (brāl), the method now in
general use in printing for the
blind, invented by Louis Braille, him-
self blind and a professor at the Institu-
tion for the Young Blind at Paris. Dis-
satisfied with the line type then in use,
he took up one invented by M. Barbier,
in which six points were used. By
studying and working over this, he
devised the simple and beautiful system
which bears his name. The Braille signs
are arbitrary, consisting of six points
placed in an oblong. By varying their
positions sixty-two combinations can be
made, sufficient for all the letters of the
alphabet, and for punctuation, contrac-
tion, numerical and other marks. See
Blind.

Brails (brāls), on ships, a name given
to all the ropes employed to
haul up the bottoms, lower corners, and
skirts of the great sails in general.

Brain (brān), the center of the nervous
system, and the seat of conscious-
ness and volition in man and the higher
animals, and hence of what we designate
as the mind. It is a soft substance,
partly gray and partly whitish, situated
in the skull, penetrated by numerous
bloodvessels, and invested by three
membranes or meninges. The outermost,
called the *dura mater*, is dense and elas-
tic. The next, the *tunica arachnoidea*, is
very thin, and is really double. The
third, the *pia mater*, covers the whole
surface of the brain, and is full of blood-
vessels. The brain consists of two prin-
cipal parts, connected by bands of fibers.
The one, called the *cerebrum*, occupies,
in man, the upper part of the head, and
is seven or eight times larger than the

other, the *cerebellum*, lying behind and below it. The surface of the brain exhibits the appearance of a series of ridges and furrows, forming what are called the *convolutions*. The cerebrum is divided into two portions, the right and left hemispheres, by the *longitudinal fissure*, the hemispheres being at the same time transversely connected by a band of nervous matter called the *corpus callosum*. The external or grayish sub-



Brain and Spinal Cord.

stance of the brain is softer than the internal white substance. It consists of nerve cells, while the white substance is composed almost entirely of fibers. The cerebellum lies below the cerebrum, in a peculiar cavity of the skull. It is divided into a right and a left hemisphere, connected by a bridge of nervous matter called the *pons Varolii*, under which is the *medulla oblongata* or continuation of the spinal marrow. Like the cerebrum, it is gray on the outside and whitish within. At the base of the brain are several masses of nervous matter or ganglia known as the *corpora striata* (two), *optic thalami* (two), and *corpora quadrigemina* (four); and there are in it five cavities named *ventricles*. Every part of the brain is exactly symmetrical with the part opposite. Twelve pairs of nerves proceed from the base of the brain, including the nerves for the organs of smell, of sight, of hearing, and of taste, also those for the muscles of the face, those for the cavity of the mouth and for the larynx. When compared with the brain of other animals, the human brain presents striking differences. Even the brain of the higher classes of the inferior vertebrate animals differs from that of man, especially in the degree of development; while among the lower grades there is sometimes, properly speaking, no brain at all, but only nerve ganglia, which correspond to the brain. In size, also, the brain of the lower animals, although sometimes (as in the elephant) actually greater, is always much less when compared with the size of the whole body, and it is found that the size

of the brain proportionally to the size of the body is a direct measure of the intelligence of different animals. In man the brain weighs from 2 to 4 lbs., the average weight in male European adults being 40 to 50 oz., or about $\frac{1}{40}$ th of the weight of the body; in the dog the average weight is about $\frac{1}{20}$ th of the animal; in the horse $\frac{1}{80}$ th; and in the sheep $\frac{1}{120}$ th. The heaviest brain yet known was that of Cuvier—64 $\frac{1}{2}$ oz. The brain of females weighs 5 oz. less on the average than that of males. The brain attains its highest degree of development earlier than any other part of the body. In old age it loses both in bulk and in weight. Comparatively little is known of the functions of the separate parts of the brain, but, speaking generally, the parts lying in front have functions connected with the intellectual part of man's nature; while the parts lying nearer the back of the head belong more to our merely animal or organic nature. As the central organ of the nervous system the brain is sympathetically affected in nearly all cases of acute disease. Diseases of the brain fall into two classes according as they exhibit mental characteristics alone or also anatomical disturbances. To the former class belong hypochondria, mania, etc. Amongst the latter may be mentioned meningitis, or inflammation of the membranes of the brain, which seldom occurs without affecting also the substance of the brain and thus giving rise to phrenitis; hydrocephalus, or water in the head, caused by pressure of water in the cavities of the brain; softening of the brain, frequently the result of chronic inflammation; and plethora or poverty of blood in the brain, which, though opposite diseases, may cause the same symptoms of giddiness.

Brain-coral, coral of the genus *Meandrina*, so called from its rounded shape and convolutions of its often large masses.

Braine-le-comte (brän-le-kont), an ancient town in Belgium, province of Hainault, about 20 miles s. s. w. of Brussels, with a handsome church of the 13th century; and breweries, dyeworks, oil and cotton mills, etc. Pop. 8935.

Brainerd (brän'erd), a city, county seat of Crow Wing Co., Minnesota, on the Northern Pacific and other railroads. It has railroad shops, foundry, flour mill, shingle and lath mill, brewing, etc. Pop. 8528.

Braintree (brän'trē), a post-village of Norfolk Co., Massachusetts, 10 miles s. of Boston. It has granite

quarries and manufactures of linen, furs, leather, etc. Pop. 8066.

Braintree, a town of Essex Co., England, 18 miles E. of Bishop Stortford. It has a spacious Gothic church, and crape and silk factories. Pop. 6168.

Brake (brāk), a contrivance for retarding or arresting motion. Familiar examples of the brake are shown in the various devices employed on ordinary vehicles, street and railway cars, elevators, hoisting engines, etc. The commonest forms comprise shoe-brakes, by which a block (brake-shoe) fastened to the vehicle is pressed by proper mechanism against the rim of the wheels; band or strap brakes, described below; disk brakes, by which a disk fast on the axle and one on the vehicle are engaged by pressure; cup or cone brakes, on the same principle as the disk type, but with a cone fitting into a cup; electric eddy-current brakes, in which a revolving disk is acted on by an electro-magnet; and electric generator brakes in which an induced current dragging back on the armature resists rotation. Track brakes are sometimes used in conjunction with shoe-brakes on electric cars. They act upon the rail either by friction or by grip. The gripping-jaw type is also used as a safety brake on elevators, and acts by gripping the guide bars. Band brakes are extensively used, chiefly on motor vehicles. They consist essentially of a metal or leather band encircling a smoothly turned hub or rim on the axle. The ends of the band have two forms of connection: In the first, one end is fastened to a fixed support, the other being attached to a lever pivoted in such manner that a pull on the handle results in a multiplied pull on the band. In the second form both ends of the band are attached to the lever, on the same side of the fulcrum at different distances. In this type breaking force is obtained by a slight pull on the lever.

Bramah (brā'ma), JOSEPH, the inventor of the Bramah lock, the Bramah press, etc., born in Yorkshire in 1749; died in 1814. He set up business in London as a manufacturer of various small articles in metal-work, and distinguished himself by a long series of inventions, such as improvements in paper-making, fire-engines, printing-machines, etc. He is especially known for an ingeniously constructed lock, and for the hydraulic press (which see).

Bramante (brā-mān'tā), FRANCESCO LAZARI, a great Italian architect, born in 1444; died 1514. His most notable work was the part he had in the building of St. Peter's, at Rome, of which he was the first architect.

Bramble (bram'bl); *Rubus fruticosus*, the name commonly applied to the bush with trailing prickly stems which bears the well-known berries usually called in Scotland brambles, and in England and the United States blackberries. It bears a resemblance to the raspberry, and belongs to the same genus, natural order Rosaceae. As a wild plant it grows in great abundance, and it is now largely cultivated in the United States with great improvement in the fruit. The flowers do not appear till late in the spring, and the fruit, which is deep purple or almost black in color, does not ripen till late summer. The dewberry is a running variety of the bramble, bearing a sweeter and larger fruit than the ordinary blackberry and ripening earlier.

Brambling, or BRAMBLE-FINCH, the mountain-finch (*Fringilla montifringilla*), larger than the chaffinch, and very like it. It breeds in the north of Scandinavia and visits the south of Europe in winter.

Brampton (bramp'ton), an ancient town of England, County Cumberland, with tweed manufactures and coaling industries. Pop. 7982.

Bran, the husky part of wheat separated by the bolter from the flour. Its components are: water, 13; gluten, 19.5; fatty matter, 5; husk with starch, 55; and ashes, 7.5; but the results of different analyses vary considerably. It is employed in feeding cattle, is mixed with white wheat flour to make bran bread, and has been found useful as a manure.

Branchiæ (brang'ki-ē). See *Gills*.

Branchiogasteropoda (brang-ki-op'o-da), gasteropodous molluscs whose respiration is aquatic, being generally effected by means of external branchiæ or gills. They include a great many animals with univalve shells, as whelks, limpets, coneshells, periwinkles, cowries, etc., also sea-hares, sea-slugs, sea-lemons, and the heteropoda.

Branchiopoda (brang-ki-op'o-da), an order of crustaceous animals, so called because their branchiæ, or gills, are situated on the feet. They have one to three masticating jaws, and the head is not distinct from the thorax, which is much reduced in size. They include the water-fleas, trilobites, phyllopods, etc.

Branchiostoma (brang-ki-os'to-ma), or LANCELET, also called *Amphioxus*. See *Lancelet*.

Branco (brang'kō), RIO, a river of N. Brazil, a tributary of the Rio

Negro, navigable for a distance of 40 miles.

Brand, is a provincial name for certain diseases of cereals, applied generically. Thus bunt is called *pepper-brand*, and smut is called *dust-brand*.

Brandeis (bran'deis), LOUIS DEMITZ, born in Louisville, Ky., November 13, 1856. He studied law and practiced in Boston after 1879. He engaged in many notable cases, opposing the New Haven Railroad monopolies and defending Glavis in the Ballinger-Pinchot investigation. Was counsel for the people in the Boston subway system, etc. Socialistic in his views and a strong reformer, he was appointed by President Wilson to fill a vacancy in the U. S. Supreme Court in 1916.

Brandes (bran'des), CARL EDVARD COHEN (1847), a Danish author, brother of Georg Brandes, eminent as a dramatist. His first play, 'Lægemidler,' appeared in 1881. His romance, 'Das Junge Blut,' because of its radical nature, led to controversy and ultimate prosecution and fine.

Brandes (brän'des), GEORG MORRIS COHEN, a famous Danish critic, of Jewish extraction, born at Copenhagen, February 4, 1842. The first of his *Samlede Skrifter* appeared in 1900. His work on *William Shakespeare* was translated by William Archer in 1898.

Brandenburg (brän'den-burg), a province of Prussia, surrounded mainly by Mecklenburg and the provinces of Pomerania, Posen, Silesia, and Prussian Saxony. The soil consists in many parts of barren sands, heaths, and moors; yet the province produces much grain, as well as fruits, hemp, flax, tobacco, etc., and supports many sheep. The forests are very extensive. The principal streams are the Elbe, the Oder, the Havel, and the Spree. Berlin is locally in Brandenburg. Area, 15,400 sq. miles; population 3,529,839. The Old Mark of Brandenburg was bestowed by the Emperor Charles IV on Frederick of Hohenzollern, and is the center round which the present extensive Kingdom of Prussia has grown up.—The town BRANDENBURG is on the Havel, 35 miles W. S. W. of Berlin. It is divided into three parts—an old town, a new town, and a cathedral town—by the river, and has considerable manufactures, including silk, woollens, leather, etc. Pop. 51,251.

Brand'ing, a form of punishment for various crimes, but abolished in 1822. It was performed by means of a red-hot iron, and the part which was branded was the cheek, the hand, or some other

part of the body. Even after branding had been abolished in all other cases, a milder form of it was for a long time retained in the army as a punishment for desertion, the letter D being marked with ink or gunpowder on the left side of a deserter 2 inches below the armpit. This also has been abolished.

Brandis (brän'dis), CHRISTIAN AUGUST, a German scholar, born in 1790; died in 1867. After studying at Kiel and Göttingen he was induced by Niebuhr to accompany him to Rome as secretary to the Prussian embassy. In 1822 he was made professor of philosophy at the University of Bonn. He won a reputation by his *History of Greek and Roman Philosophy*.

Brand'ling, is a species of fish, the salmon, so named from its markings being, as it were, branded. The name is also given to a small red worm used for bait in fresh-water fishing.

Bran'don, a rising town of Canada, in Winnipeg, Manitoba, 134 m. west of Winnipeg. It has various manufactures and wholesale houses. Here are collegiate and normal schools, and Indian industrial school and a government experimental farm. Pop. 18,000.

Brandt (bränt), or BRANT, SEBASTIAN, author of a famous German satire, the *Narrenschiff*, or *Ship of Fools*. He was born at Strasburg in 1458, and studied law at Basel, dying in 1521. The *Narrenschiff* is written in verse, and is a bold and vigorous satire on the vices and follies of the age. It took the popular taste of its time, and was translated into all the languages of Europe. The *Ship of Fools* by Alexander Barclay (1509) is partly an imitation, partly a translation of it.

Brandy (bran'di), the liquor obtained by the distillation of wine or of the refuse of the winepress. It is colorless at first, but usually derives a brownish color from the casks in which it is kept, or from coloring matters added to it. The best brandy is made in France, particularly in the Cognac district in the department of Charente. Much of the so-called brandy sold in Britain and America is made there from more or less coarse whisky, flavored and colored to resemble the real article; and France itself also exports quantities of this stuff. Brandy is often used medicinally as a stimulant, stomachic, and restorative, or in mild diarrhoea. In America various distilled liquors get the name of brandy, as cider brandy, peach brandy.

Brandywine Creek, a small river which rises in

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the State of Pennsylvania, passes into the State of Delaware, and joins Christiana Creek near Wilmington. It gives its name to a battle fought near it, Sept. 11, 1777, between the British and Americans, in which the latter were defeated.

Brank, or **BRANKS**, an instrument formerly in use in Scotland, and to some extent also in England, as a punishment for scolds. It consisted of an iron frame which went over the head of the offender, and had in front an iron plate which was inserted in the mouth, where it was fixed above the tongue, and kept it perfectly quiet.

Brant, **JOSEPH**; Indian name *Thayendanegea* (1742-1807), a famous chief of the Mohawk tribe. He fought against the colonists in the Revolution, holding a commission in the British army, participating in the Cherry Valley (q. v.) and Minisink massacres and took an active part in the battle of Oriskany (q. v.). He was a favorite of Sir William Johnson (q. v.).—**MOLLY**, his sister, was the mistress of Johnson.

Brant'ford, a city of Ontario, Canada, on the Grand River (which is navigable), 24 m. w. s. w. of Hamilton; it has railway machine-shops, foundries, and cotton and woolen mills, and an active trade. Pop. (1911) 23,046.

Brantôme (brân-tôm), **PIERRE DE BOURDEILLES, SEIGNEUR DE**, a French writer, born in Périgord about 1540; died in 1614. He was of an old and noble family, and early entered the profession of arms. After a brilliant life in courts and camps he withdrew to his estate in Périgord, and spent his time in writing memoirs, which give an admirable picture of his age, with particulars which a chaster and more fastidious pen could hardly have set down. His memoirs consist of *Vies des Hommes illustres et des grands Capitaines Français*; *Vies des grands Capitaines Étrangers*; *Vies des Dames illustres*; *Vies des Dames galantes*.

Brasenose (brâs'nôs), one of the colleges of Oxford University, founded by William Smith, Bishop of Lincoln, and Sir Richard Sutton, in 1509. The origin of the name is doubtful, but there is a large nose of brass over the entrance. The college is very rich in endowments.

Brasidas (bras'i-das), a Spartan general who during the

Peloponnesian war overthrew the Athenian army under Cleon at Amphipolis, but was himself mortally wounded, a. c. 422.

Brass, is an alloy of copper and zinc, of a bright yellow color, and hard, ductile, and malleable. Ordinary brass consists of two parts by weight of copper to one of zinc; but any degree of variation may be obtained by altering the proportions; thus by increasing the quantity of copper we may form *tombac* and *pinchbeck*, and with nearly a seventh more of zinc than copper the compound becomes brittle and of a silver-white color. By increasing the copper, on the other hand, the compound increases in strength and tenacity. Brass which is to be turned or filed is made workable by mixing about 2 per cent of lead in the alloy, which has the effect of hardening the brass and preventing the tool being clogged. For engraving purposes a little tin is usually mixed with the brass. Brass is used for a vast variety of purposes, both useful and ornamental. Birmingham, England, is the chief seat of the copper and brass trade in that country.

Brassarts (bras'sarts), pieces of ancient plate armor which united the armor-plates on the shoulder and elbow. Demibrassarts shielded only the front.

Brasses (bras'es), **SEPULCHRAL** or **MONUMENTAL**, large plates

of brass inlaid in polished slabs of stone, and usually exhibiting the figure of the person intended to be commemorated, either in a carved outline on the plate or in the form of the plate itself. In place of the figure we sometimes find an ornamented cross. The earliest example of these monumental slabs now existing in England is that on the tomb of Sir John D'Aberno (died 1277) at Stoke D'Abernon in Surrey. These brasses are considered of great value in



Brass—Westminster Abbey

giving us an exact picture of the costumes of the time to which they belong.

Brasseur de Bourbourg (brä-sœur dè bôr-bôr), CHARLES ÉTIENNE, a French writer on American history, archæology, and ethnology, born in 1814; died in 1874. He entered the priesthood, was sent to North America by the Propaganda, and lived and traveled here and in Central America for a number of years, partly in the performance of ecclesiastical functions. Among his works are *Histoire du Canada* (1851), *Histoire des Nations civilisées du Mexique et de l'Amérique Centrale* (1857-58), *Gramatica de la Lengua Quiche* (1862) *Monuments anciens du Mexique* (1864-66), *Etudes sur le Système graphique et la Langue des Mayas* (1869-70), etc.

Brassey, EARL, a noted English naval man, expert, economist and yachtsman, born in 1836. He was knighted in 1881; first peerage, a barony, in 1886. In 1894 he was made a lord-in-waiting by Queen Victoria. From 1895 to 1900 he held office as Governor of Victoria, Australia. He was created earl in 1911. At the beginning of the European war, Lord Brassey, despite his 78 years of age, joined the Royal Naval Reserve and was sent to the Dardanelles in an advisory capacity. He died February 24, 1918.

Brassica (bras-si-ka), an important genus of cruciferous plants, including among its numerous species many of great economical value, as the cabbage, turnip, rape, etc. Owing to the numerous crossed races which have been produced in modern times, the limits of the species have been broken down.

Brattleboro, a town of Windham County, Vermont, on Wantastiquet Lake, a body of water formed by damming the Connecticut River. The dam provides water power and there are manufactures of reed and pipe organs, toys, furniture, etc. It is the center of the Vermont maple-sugar industry. Pop 7541.

Braunsberg (brounz'berg), a town, Prussia, government of Königsberg, on the Passarge, about 4 miles from its junction with the Frische Haff. Pop. 12,497.

Brauer (brou'ver), ADRIAN. See Brouwer.

Bravi (brä've), the name formerly given in Italy, and particularly in Venice, to those who were ready to hire themselves out to perform any desperate undertaking. The word had the same signification in Spain, and both the word and the persons designated by it were found in France in the reign of

Louis XIII and during the minority of Louis XIV. Singular form *Bravo*.

Bravo (brä'vô), an Italian adjective used as exclamation of praise in theaters, meaning 'well done! excellent!' The correct usage is to say *bravo* to a man, *brava* to a woman, *bravi* to several persons.

Bravura Air (brav-û'ra), an air so composed as to enable the singer to show his skill in execution by the addition of embellishments, striking cadences, etc.

Brawn (brân), a preparation made from the flesh of swine freed from all bones, formed into a roll, boiled, and pressed. Wiltshire brawn is in much repute.

Braxy (brak'si), a disease of sheep, being a plethora of the blood resulting from a change from poor to rich pasturage, usually fatal in a few hours. The flesh of sheep that die of this disease is often eaten in Scotland.

Bray (brâ), a watering-place in Ireland, partly in County Dublin and partly in Wicklow, picturesquely situated on both banks of the Bray, 12 miles S.E. of Dublin. Pop. about 7000.

Brazil (bra-zil'), a republic in South America, occupying a space nearly equal to one-half of that continent; greatest length, E. to W., 2750 miles; greatest length, N. to S., 2600 miles; area estimated at 3,290,671 square miles, or about one-sixth smaller than Europe. It is bounded S.E., E., and N.E. by the Atlantic Ocean, N. by French Guiana, Dutch, and English Guiana, and Venezuela; W. and S.W. by Ecuador, Peru, Bolivia, Paraguay, the Argentine Confederation, and the Republic of Uruguay. Brazil is divided politically into 20 states and the federal district of Rio de Janeiro and has a population of nearly 21,000,000.

The coast has few indentations of importance—the chief being the estuary of the Amazon and Pará in the north—and good harbors are comparatively few. As a whole, the country may be regarded as having three natural divisions, namely, one belonging to the basin of the Amazon, of the north, another belonging to the La Plata basin of the south, and a third consisting of the east central portion watered by a number of streams directly entering the Atlantic. The Amazon valley is bounded by elevated tablelands which, in the lower course of the river, approach within a comparatively short distance of each other. The characteristic feature of this region is immense low-lying, forest-covered plains intersected by a great number of water courses, and in many parts subject

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annual inundation, the vegetation being of the most luxuriant character, from the heat and frequent rains. The greater part of this vast region is unpopulated except by Indians, and as yet of little commercial importance. The climate, notwithstanding the tropical heat and moisture, is comparatively healthy, and the facility for commerce given by thousands of miles of great navigable streams must in time attract numerous settlers. To some extent this has already taken place in the region of the Lower Amazon. Here the development of a trade in the product of the India-rubber trees, which grow in vast quantities, has attracted thousands of Brazilians from the adjoining provinces, and thus 'has covered thousands of miles of rivers with steamers, and spread a population over vast areas that otherwise would have remained dormant for many years.' This northern part of Brazil is unequalled in the number and magnitude of the streams which compose its river system and connect it with Venezuela, Colombia, Ecuador, Peru, and Bolivia. On the north side the chief tributaries of the Amazon are the Rio Negro and the Japura, the former giving through the Cassiquiare continuous water communication with the Orinoco. Amongst the southern affluents which are important as water highways into the interior of Brazil are the Xingu, the Tapajos, the Madeira, the Purus, and the Jurua; the Madeira being the most important, and forming a navigable waterway into Bolivia, except that it is interrupted by falls about 200 miles below where it enters Brazil. The Tocantins is another large stream from the south, which enters the Pará estuary and hardly belongs to the Amazon basin. The forest region of the Amazon occupies about one-fourth of the empire; the rest is made up of undulating tablelands 1000 to 3000 feet above the sea, mountain ranges rising to 10,000 feet, and river valleys.

The great streams belonging to the La Plata basin, in the south, are the Paraguay and Paraná. The watershed between this and the Amazonian basin, near the western boundary of Brazil, is only about 500 feet above sea-level, and here a canoe can be hauled across from a headstream of the Madeira to be launched on one belonging to the Paraguay. It would thus be easy to connect the one system with the other by means of a canal, and so connect the La Plata with the Orinoco. The watershed rises gradually from west to east. The southern part of Brazil is characterized by its low plains or *pampas*, covered with

grass or scrub. Its vegetation is of a much less tropical character than in the Amazon basin, and its climate more variable. In many parts of this region there is an admirable field for future colonization, though it is as yet defective as a means of transport. Near the coast, in the states of S. Paulo, Rio Grande, and Paraná, there is already a considerable population, much augmented by German and Italian immigration, and chiefly occupied in cattle-raising and agriculture. Railways also have been constructed here and given a great stimulus to trade.

The most important river in eastern Brazil is the San Francisco, which is the great waterway into its interior and after a course of 1800 miles discharges its waters into the Atlantic. Three of the large cities of Brazil, Rio de Janeiro, Pernambuco, and Bahia, are developing a considerable traffic in connection with this stream, which can be utilized as a commercial waterway over a very large extent of territory and thus bring the produce of the interior to the centers of export, whence they are distributed in world-wide trade. Eastern Brazil exhibits a great variety in surface, climate, and productions, and though large tracts consist of arid and sandy tablelands, it contains within itself the greater part of the population, wealth, and industry of the republic.

The chief mountain ranges are near the southeastern coast. The Serra do Mar or Maritime range commences in the far south, and travels close to the coast-line in a northeasterly direction till it reaches Rio de Janeiro and Cape Frio, where it culminates in the Serra dos Orgaos, or Organ Mountains, from 7000 to 8000 feet above the sea, and forming the noblest element in the marvelous scenery of the bay of Rio de Janeiro. West of the Serra do Mar lies the Serra Maatequeira, which farther north is known as the Serra do Espinhaço. Here are the loftiest summits in Brazil, Itatiaia-Assu, the highest of all, being 9823 feet above the sea. Between the sources of the Tocantins and Paraná are the Montes Pyreneos, the second most elevated ridge in Brazil, some of its heights being estimated at from 3000 to 4500 feet above the level of the sea.

As almost the whole of Brazil lies S. of the equator, and in a hemisphere where there is a greater proportion of sea than land, its climate is generally more cool and moist than that of countries in corresponding latitudes in the northern hemisphere. In the S. parts of Brazil, in consequence of the gradual narrowing

of the continent, the climate is of an insular character—cool summers and mild winters. The quantity of rain differs widely in different localities. The n. provinces generally are subject to heavy rains. At Rio, where the climate has been much modified by the clearing away of the forests in the neighborhood, the mean temperature of the year is 74°. At Pernambuco the temperature rarely exceeds 82°; in winter it descends to 68°. Generally the climate of the coastal and upland regions of Brazil is agreeable. In the great Amazonian section perpetual summer reigns, with two seasons, the wet and the dry, the heat being tempered by the forest expanse and the trade wind, which almost constantly blows up the river.

Only an insignificant portion of Brazil is as yet under cultivation. The pastures are of vast extent, and support great herds of horned cattle, one of the principal sources of the wealth of the country. The chief food-supply plants are sugar, coffee, cocoa, rice, tobacco, maize, wheat, manioc (or cassava), beans, bananas, ginger, yams, lemons, oranges, figs, etc.—the first two, sugar and coffee, being the staple products of the country. More coffee, indeed, is produced in Brazil than in all the rest of the world together. In its forests Brazil possesses a great source of wealth. They yield dyewoods and cabinet woods of various kinds, including Brazil-wood, rosewood, fustic, cedar, mahogany, and a variety of others, as also Brazil-nuts, cocoanuts, vegetable ivory, India rubber, copaiba, annatto, piassava fiber, etc. Other vegetable products are vanilla, sarsaparilla, ipecacuanha, cinnamon, and cloves.

The principal domestic animals of Brazil are horned cattle and horses. Sheep are kept only in minor parts, chiefly in the south. Goats and hogs are abundant. The wild animals comprise the puma, jaguar, sloth, porcupine, etc. Monkeys are numerous. Amongst the feathered tribes are the smallest of all birds, the humming-bird, and one of the largest, the rhea, while there are parrots in great variety, tanagers, toucans, and the harpy eagle. The reptiles consist of the boa-constrictor and other species of serpents, some of them venomous, alligators, and fresh-water turtles, the eggs of which yield a valuable food. The insects are, many of them, remarkable for the beauty of their colors and their size, especially the butterflies. They are of vast number and variety, among them large and destructive species of ants, and the scorpion, which attains a length of 6 inches. Among minerals the diamonds

and other precious stones of Brazil—emeralds, sapphires, rubies, beryls, etc.—are well known. Gold also is procured in considerable quantities. Other minerals are quicksilver, copper, manganese, iron, lead, tin, antimony, and bismuth. The shores and rivers abound with fish.

The population of Brazil consists of whites, Indians, negroes, and people of mixed blood. The native Brazilians, mostly descendants of the Portuguese settlers, but often with a mixture of Indian or African blood, are said to be greatly wanting in energy. The white population, which is, perhaps, a third of the whole, has in recent years been increased by Italian, Portuguese, and German immigration. The negroes are over 2,000,000 in number, and till 1888 were partly slaves. Of the Indians, some are semicivilized, but others (estimated at 600,000) roam about in a wild state, and are divided into a great many tribes speaking different languages. The state language is Portuguese. Primary education is gratuitous, but the great majority of the people are illiterate, though education is now compulsory in some provinces.

The principal imports are cottons, linens, woollens, machinery, hardware and cutlery, wheat, flour, wine, coals, etc., the manufactured articles and coals being largely from Britain. The exports consist of coffee, rubber, sugar, cotton, hides, cabinet and dye woods, drugs, etc. The main export is coffee, the total value exported in 1912 being \$226,276,155. The total value of exports the same year \$362,794,846; of imports \$308,243,736. The chief money of account is the gold milreis (1000 reis), equivalent at par to 54.6 cents. A new gold coin is valued at about \$5. The length of telegraph lines in Brazil is about 21,000 miles; of rail ways, 14,500.

The established religion of Brazil was Roman Catholic, under the empire; now there is no state church. The government, until 1889, was hereditary-monarchical; when by a revolution Emperor Dom Pedro II was dethroned and Brazil declared a republic. In 1890 the provisional government convoked a national congress, which, in 1891, established a new constitution, whereby the Brazilian nation, adopting the federative republican form of government, constituted itself a the United States of Brazil. The public debt is stated at about \$650,000,000. The revenue, as estimated for 1913, was about \$192,729,000. The peace strength of the army is 33,000. The navy consists of 7 modern, 9 old battleships and a few cruisers, torpedo boats, etc.

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Brazil was discovered in 1499 by Vincente Yanez Pinçon, one of the companions of Columbus in the service of Spain, and next year was taken possession of by Pedro Alvares de Cabral on behalf of Portugal. The first governor-general was Thome de Sousa, who in 1549 arrived in the Bay of Bahia and established the new city of that name, making it the seat of his government. The usurpation of the crown of Portugal by Philip II left Brazil in a defenseless and neglected condition, and the English, French, and Dutch made successive attempts to obtain a footing. The Dutch were the most persevering, and for a time almost divided the Brazilian territory with the Portuguese. The tyranny of the Dutch governors, however, incited their native and Portuguese subjects to revolt, and after a sanguinary war, in 1654 the Dutch were driven out and the Portuguese remained masters of an undivided Brazil. The value of Brazil to Portugal continued steadily to increase after the discovery of the gold mines in 1698 and of the diamond mines in 1728. The vigorous policy of the Portuguese government under the administration of the Marquis de Pombal (1760-77) did much to open up the interior of Brazil, though his high-handed modes of procedure left amongst the Brazilians a discontent with the home government which took shape in the abortive revolt of 1789. On the invasion of Portugal in 1808 by the French the sovereign of that kingdom, John VI, sailed for Brazil, accompanied by his court and a large body of emigrants. He raised Brazil to the rank of a kingdom, and assumed the title of King of Portugal and Brazil. But on his return to Portugal in 1820 he found the Portuguese Cortes unwilling to grant civil and political equality to the Brazilians—a fact which raised such violent convulsions in Rio Janeiro and other parts of Brazil that Dom Pedro, the king's son, was forced to head the party resolved to make Brazil independent, and in 1822 a national assembly declared the separation of Brazil from Portugal, and appointed Dom Pedro the constitutional emperor. In 1864 began a severe struggle between Brazil and Paraguay, caused principally by the arbitrary conduct of Lopez, the dictator of Paraguay. Brazil had to bear the brunt of the war, which terminated only with the death of Lopez in 1870. This struggle secured the freedom of the navigation of the La Plata river-system. In 1888 slavery was finally abolished. After the revolution of 1889, above mentioned, Marshal da Fonseca became the first president, succeeded in 1891 by Floriano Peixoto. A revolt, led by Admiral Mello, occurred in 1893, during which Rio Janeiro was bombarded and Peixoto's retirement demanded. Brazil in 1910 had a population estimated at over 20,000,000, and its capital, Rio de Janeiro, 1,128,057. The population of the republic includes large settlements of Germans, an isolated element which, it was feared, cherished purposes hostile to the independence of Brazil. This, and a German attack on a Brazilian vessel, led in 1917, to a declaration of war against Germany. Brazil was, however, in no position at that time to take any active part in war, its fleet and army alike being negligible. Thus its influence was chiefly moral.

Brazil, county seat of Clay Co., Indiana, 16 miles E. N. E. of Terre Haute. There are mines of good coal in the vicinity and the manufactures include clay products, turret machines, tin products, pianos, mining machinery, wire fence and fence machines. Pop. 12,000.

Brazil-nuts, The seeds of *Bertholletia excelsa*. See *Bertholletia*.

Brazil-tea, a name for *Maté* (which see).

Brazil-wood, a kind of wood yielding a red dye, obtained from several trees of the genus *Casalpinia*, order Leguminosae, natives of the West Indies and Central and South America. The best kind is *Casalpinia echinata*; other varieties are *C. brasiliensis*, *C. erista*, and *C. sappan*. The wood is hard and heavy, and as it takes on a fine polish it is used by cabinet-makers for various purposes, but its principal use is in dyeing red. The dye is obtained by reducing the wood to powder and boiling it in water, when the water receives the red coloring principle, which is a crystallizable substance called *brazilin*. The color is not permanent unless fixed by suitable mordants.

Braz'ing, or BRASS-SOLDERING. See *Solder*.

Brazos (brá'zôs), a large river of Texas, rising in the N. W. part of the state, and flowing into the Gulf of Mexico, after a course of 900 miles, at a point 40 miles W. S. W. of Galveston. During the rainy season, from February to May, inclusive, it is navigable by steamboats for about 300 miles.

Brazza (brát'sá), an island in the Adriatic, part of Dalmatia, 24 miles long and from 5 to 7 broad, mountainous and well wooded. It produces good wines and oil, almonds, silk, etc. Pop. 24,408.

Braz'zaville, a commercial river port of French Congo, situated on the right bank of Stanley Pool, in

the Congo, opposite Leopoldville. Pop. about 5000. Founded by S. de Brassa, a traveler, and governor of French Congo, in 1880.

Breach (bräch), the aperture or passage made in the wall of any fortified place by the ordnance of besiegers for the purpose of entering the fortress.—*Breaching batteries* are batteries of heavy guns intended to make a breach.

Breach, in law, any violation of a law, or the non-performance of a duty imposed by law. Breaches are of various kinds:—*Breach of Close*, in English law, any entry upon another man's property which is not warranted by being made in the exercise of a right.—*Breach of Covenant*, the act of violating an agreement in a deed either to do or not to do something.—*Breach of Peace* is an offense against the public safety or tranquillity either personally or by inciting others. Breaches of peace are such as affrays, riots, routs, and unlawful assemblies, forcible entry or detainer by violently taking or keeping possession of lands or tenements with menaces, force, and arms; riding, or going, armed with dangerous or unusual weapons, terrifying people; challenging another to fight, or bearing such a challenge, besides certain other offenses.—*Breach of Promise* (of marriage), the failure to implement one's promise to marry a particular person, in consequence of which that person may raise an action for damages, though it is only the woman as a rule that gains damages.—*Breach of Trust* is a violation of duty by a trustee, executor, or any other person in a fiduciary position, as, for instance, when a trustee manages an estate entrusted to him for his own advantage rather than for that of the trust.

Bread, is the product of grain meal when kneaded with water into a tough and consistent paste and baked. There are numerous kinds of bread, according to materials and methods of preparation; but all may be divided into two classes: *fermented, leavened, or raised, and unfermented unleavened, or not raised.* The latter is the simplest, and no doubt was the original kind, and is still exemplified by biscuits, the oat-cakes of Scotland, the corn-bread of America, the *dampers* of the Australian colonies, and the still ruder bread of savage races. It was probably by accident that the method of bringing the paste into a state of fermentation was found out, by which its toughness is almost entirely destroyed, and it becomes porous, palatable, and digestible. All the cereals are used in

making bread, each zone using those which are native to it. Thus maize, millet, and rice are used for the purpose in the hotter countries, rye, barley, and oats in the colder, and wheat in the intermediate or more temperate regions. In the most advanced countries bread is made from wheat, which makes the lightest and most spongy bread. The fermentation necessary for the ordinary loaf-bread is generally produced by means of leaven or yeast, and the first thing to be done towards the manufacture of a batch of bread is, in the language of the baker, *to stir a ferment.* For this purpose water, yeast, flour, and some potatoes mashed and strained through a colander are mixed together and worked up into a thin paste, in which, on being left to stand for a time, an active fermentation sets in, the carbonic acid generated causing the mixture to rise and fall. In about three hours the fermenting action ceases, and the mixture may now be used, but it is not generally used till at the end of four or five hours. The next operation is called *setting the sponge.* This consists in stirring up the above ferment well, adding some lukewarm water, and mixing in as much flour as will make the whole into a pretty stiff dough, which receives the name of the *sponge.* The sponge, being kept in a warm place, begins to ferment in the course of an hour or so, heaving and swelling up till at last the imprisoned carbonic acid bursts from the mass, which then sinks or collapses. This is called *the first sponge*, and from it the bread may be made; but the fermentation is often allowed to proceed, and the rising and falling to go on a second time, producing what the bakers call *the second sponge.* The next process is called *breaking the sponge*, and consists in adding to it the requisite quantity of water and salt, the sponge being thoroughly mixed up with the water. The remainder of the total quantity of flour intended to be employed is gradually added, and the whole is kneaded into a dough of the due consistency. The dough, being allowed to remain in the trough till it rise or give *proof*, is then weighed off into lumps, which are shaped into loaves and placed in the oven. In the process of baking they swell to about double their original size. The chemical changes which have been taking place during this process may be explained in the following way: An average quality of flour consists of gluten 12, starch 70, sugar 5, gum 3, water 10; total, 100. When water is added to the flour, in the first operation of baking, it unites with the gluten and

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starch, and dissolves the gum and sugar. The yeast or barm added acts now upon the dissolved sugar, especially at an elevated temperature, and produces the vinous fermentation, forming alcohol and setting free carbonic acid as a consequence of the transformation of the elements of the sugar. The gaseous carbonic acid is prevented from escaping by the gluten of the mass, and if the mixing or kneading has been properly performed it remains very equally diffused through every part of the dough. The alcohol and carbonic acid are carried into the oven with the dough, and the former partially escapes, while the latter gas, being expanded by the heat, produces the lightness and sponginess of the loaf. It may be produced in bread-making by other means than fermentation, as by some of those well-known preparations called 'baking powders,' which usually contain bicarbonate of potash or of soda, with tartaric acid. *Aërated bread* is so called because made with aerated water—that is, water strongly impregnated with carbonic acid under pressure, the dough being also worked up under pressure and caused to expand by the carbonic acid when the pressure is removed.

The number of grindings which grain receives determines the character and variety of the finished products. Flour is generally classed under the following heads: *Graham*, which is simply wheat meal, the whole of the grain being used; *whole wheat*, the entire grain being used after the removal of the outer branny covering; and *straight patent* or *standard patent*, which contains neither the bran nor germ of the grain, but is nevertheless composed of nearly three-fourths of the kernel.

Various adulterants are used in bread-making, such as chalk, starch, potatoes, etc.; but the commonest is alum, which enables the baker to give to bread of inferior flavor the whiteness of the best bread, and also to keep in the loaf an undue quantity of water, which, of course, increases its weight. Boiled rice is also used for the same purpose. In the making of bread the flour or meal of wheat, barley, rye, oats, buckwheat, Indian corn, rice, beans, pease, and potatoes may be used, along with salt, eggs, water, milk, and leaven or yeast of any kind; but any other ingredient is regarded as an adulteration.

Breadalbane (bre-dal'bān), a Highland district in the western part of Perthshire, in the center of the Grampians. It gives his title to the Marquis of Breadalbane, head of a branch of the Campbell family, who is the chief proprietor in the district.

Breadfruit, a large globular fruit of a pale-green color, about the size of a child's head, marked on the surface with irregular six-sided depressions, and containing a white and somewhat fibrous pulp, which when ripe becomes juicy and yellow. The tree that produces it (*Artocarpus incisa*) belongs to the order Artocarpaceæ (nearly allied to the Urticaceæ or nettle tribe), and grows wild in Otaheite and other islands of the South Seas, whence it was introduced into the West Indies and S. America. It is about 40 feet high, with large and spreading branches, and has large bright-green leaves deeply divided into seven or nine spear-shaped lobes. The fruit is generally eaten immediately after being gathered, but is also often prepared so as to keep for some time either by baking it while in close underground pits or by beating it into paste and storing it underground, when a slight fermentation takes place. The eatable part lies between the skin and the core, and is somewhat of the consistence of new bread. Mixed with cocoanut milk it makes an excellent pudding. The inner bark of the tree is made into a kind of cloth. The wood is used for the building of boats and for furniture. The jack (*Artocarpus integrifolia*), much used in India and Ceylon, is another member of this genus.



Breadfruit.

Breadnuts, the seeds of the *Brosimum alicastrum*, a tree of the same order as the breadfruit (which see). The breadnut tree is a native of Jamaica. Its wood, which resembles mahogany, is useful to cabinet-makers, and its nuts make a pleasant food, in taste not unlike hazelnuts.

Breadroot, *Psoralea esculenta*, a leguminous plant of the United States, with edible farinaceous tubers.

Break, or **BRAKE**, a large four-wheeled vehicle with a straight body and a raised seat in front for the driver, and containing seats for six, eight, or more persons.

Break'er, **COAL**, an apparatus at the mouth of coal mines to break the lumps of coal into marketable sizes. It consists of great rollers which crush the great masses as they are dumped into its mouth, whence they pass

down its slope after being broken. The pieces as they descend, fall into sieves of various sized mesh thus assorting the different sizes. From the sieves the coal is delivered to long chutes, down which it passes to the bins. All hard coal needs to be treated in this way.

Breaking bulk, the act of beginning to unlade a ship, or of discharging the first part of the cargo.

Break'water, a work constructed in front of a harbor to serve as a protection against the violence of the waves. The name may also be given to any structure which is erected in the sea with the object of breaking the force of the waves without and producing a calm within. Breakwaters are usually constructed by sinking loads of unwrought stone along the line where they are to be laid, and allowing them to find their angle of repose under the action of the waves. When the mass rises to the surface, or near it, it is surmounted with a pile of masonry, sloped outwards in such a manner as will best enable it to resist the action of the waves. The great breakwaters are those of Cherbourg in France, Plymouth in England, and Delaware Bay in the United States; the last being capable of sheltering 1000 vessels at once. In England those at Holyhead and Portland may also be mentioned as great works of engineering. At Dover a breakwater, begun in 1840, has been completed at an enormous outlay, the great depth and frequent storms being formidable obstacles. In the United States important breakwaters have been constructed at Sandy Bay, Massachusetts, Point Judith, Rhode Island, and San Pedro, California. In less important localities floating breakwaters are occasionally used. These are built of strong open woodwork, partly above and partly under water, divided into several sections, and secured by chains attached to fixed bodies. The breakers lose nearly all their force in passing through the beams of such a structure. A breakwater of this kind may last for twenty-five years.

Bream (*Abramis brama*), a fish sometimes called carp-bream, belonging to the family Cyprinidae or carps. It is about 2 to 2½ feet long, and of a yellowish-white color. It is found in many European lakes and rivers, and affords good sport to the angler, but is a very coarse and insipid food. It prefers still water with a bottom of soft soil, and feeds both on animal and vegetable matter. The name is also given to various kinds of sea-fishes, mainly of the family Sparidae, as the black sea-bream,

the common sea-bream or gilt-head, the short sea-bream, etc.



Bream or Golden Shiner.

Breaming (brēm'ing), a nautical term meaning the operation of clearing a ship's bottom by means of fire of the shells, sea-weeds, barnacles, etc., that have become attached to it. It is performed by holding to the hull kindled furze, reeds, or such like light combustibles, so as to soften the pitch and loosen the adherent matters, which may be then easily swept off.

Breast, THE FEMALE, is a compound racemose gland provided for the secretion of milk, with excretory ducts, which open by small orifices in the nipple, and discharge the secreted fluid for the nourishment of the child. At the center of each breast there is a small projection, the nipple, and this is surrounded by a dark ring termed the areola. The breast is liable to many diseases, from irritation during nursing, bruises of the part, undue pressure from tight clothes, and from constitutional causes. Among the most common of these is inflammation arising from a superabundant secretion of milk during nursing.

Breastplate, a piece of defensive armor covering the breast, made of leather, brass, iron, steel, or other metals. Among the ancient Jews the name was given to a folded piece of rich, embroidered cloth worn by the high-priest. It was set with twelve precious stones bearing the names of the tribes.

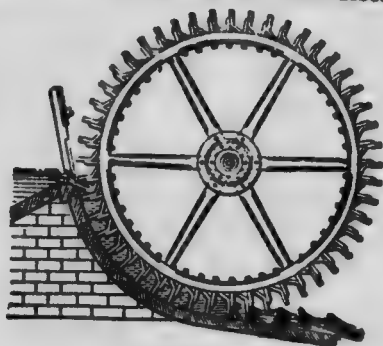
Breast-wheel, a water-wheel in which the water driving it is delivered to the float-boards between the top and bottom, generally a little below the level of the axis. In this kind of wheel the water acts partly by impulse, partly by weight.

Breastwork, in the military art, a hastily-constructed parapet made for protection against the shot of the enemy, generally composed of earth.

Breath, the air which issues from the lungs during respiration through the nose and mouth. A smaller

Breathing

portion of oxygen and a larger portion of carbonic acid are contained in the air which is exhaled than in that which is inhaled. There are also aqueous particles in the breath, which are precipitated by the coldness of the external air in the form of visible vapor; likewise other substances which owe their origin to secretions in the mouth, nose, windpipe, and lungs. These cause the changes in the breath which may be known by the smell. A bad breath is often caused by local affections in the nose, the mouth, or the windpipe; viz. by ulcers in the nose, cancerous polypi, by discharges from the mouth, by sores on the lungs, or peculiar secretions in them. It is also caused by rotten teeth, by impurities in the mouth, and by some kinds of food. The remedies, of course, vary. Frequent washing, gargles of chlorine-water, charcoal, etc., are prescribed according to the disease.



Breast-Wheel.

Breathing. See *Respiration*.

Breccia (brech'i-a), a rocky mass composed of angular fragments of the same rock or of different rocks united by a matrix or cement. Sometimes a few of the fragments are a little rounded. When rounded stones and angular fragments are united by a cement the aggregate is usually called conglomerate or pudding-stone. *Osseous breccia* is, as its name implies, composed of bones.

Brechin (bré'kin), a royal and interesting borough of Scotland, in Forfarshire, finely situated on the South Esk. It has considerable linen manufactures, two distilleries, a paper-mill, etc. It is an old town; was the seat of a Culdee college, and from the 12th century that of a bishop. There is a cathedral which dates back to the 13th century, a plain building, now the parish church, and near it is the tall round tower which, except that at Abernethy, is the only example of this kind of structure in Scotland. Almost in the town and

overlooking the river stands Brechin Castle, the ancient seat of the Maules of Panmure (Earls of Dalhousie). Pop. 8941.

Brecon (brek'on), or BRECK'NOCK, a mountainous county of South Wales; area 734 square miles. It is very mountainous, and is watered by the Wye, the Usk, the Taf, etc. Though rugged in its surface, nearly half of it is under cultivation or in pasture; and wool, butter, and cattle are sent into the English markets. There are extensive ironworks in the S.E., but it contains only a small part of the coal field which extends into the adjacent counties of Monmouth and Glamorgan. Half the inhabitants still speak Welsh. Pop. in 1901, 54,213; in 1911, 59,208. BRECON, or BRECKNOCK, the capital of the above county, previous to 1885 a parliamentary borough, stands near its center, in an open valley at the confluence of the Honddu and Usk, and in the midst of the grandest scenery of South Wales. The chief trade is in connection with agriculture and the manufacture of iron. Mrs. Siddons and Charles Kemble were natives of Brecon. Pop. 5908.

Breda (brá-dá'), a town in Holland, province of North Brabant, at the confluence of the Merk and the Aa. Breda was once a strong fortress and of great military importance as a strategical position. From the 16th to the end of the 18th century Breda has an interesting military history of sieges, assaults, and captures, with which the names of the most famous generals of their time, the Duke of Parma, Maurice of Orange, the Marquis Spinola, Dumouriez, and Pichegru, etc., are connected. It was the residence for a time of the exiled Charles II of England, and it was in the Declaration of Breda that he promised liberty of conscience, a general amnesty, etc., on his restoration. Pop. 26,897.

Bree (brá), MATTHÆUS IGNAZIUS VAN, a Flemish painter, born in 1773; died in 1839. He painted the *Death of Cato* and other classical subjects, as well as scenes pertaining to modern history.

Breckinridge (brek'in-rij), JOHN CABELL, statesman and soldier, born near Lexington, Kentucky, in 1821; died in 1875. He was elected to Congress from Kentucky by the Democratic party in 1851 and 1853, and in 1856 was elected Vice-President with James Buchanan as President. He was nominated for President in 1860 by the Southern Democrats and received seventy-two electoral votes. Subsequently elected to the Senate, he took his

sent in March, 1861, but went South in September and took arms as a brigadier-general in the Confederate army. In 1865 he was made Confederate Secretary of War. After the surrender of Lee he went to Europe, but returned in 1868.

Breech, BREECH-LOADING. The breech is the solid mass of metal behind the bore of a gun, and that by which the shock of the explosion is principally sustained. In breech-loading arms the charge is introduced here, there being a mechanism by which the breech can be opened and closed. In small arms the advantages of breech-loading for rapidity of fire, facility of cleaning, etc., have recently recommended it to general use, and its efficacy for military purposes was effectively demonstrated by the Prussian campaigns against Denmark and Austria in 1864 and 1866. Since that time every government has adopted the new system, both in small arms and heavy ordnance, while breech-loading sporting arms are also in general use. The chief difficulty in breech-loading is to close the breech so as to prevent the escape of the highly elastic gas to which the force of the explosion is due, but the appliances of modern science and mechanical art may be said to have effectually met this difficulty. See *Cannon, Cartridge, Musket*, etc.

Breeches (brêch'es), an article of clothing for the legs and lower part of the body in use among the Babylonians and other ancient peoples as well as among the moderns. In Europe we find them first used among the Gauls; hence the Romans called a part of Gaul, *breeched Gaul* (*Gallia braccata*). Trousers are longer and looser than the breeches that used to be worn.

Breeching (brêch'ing), a rope to secure a ship's gun and prevent it from recoiling too much in battle.

Breeding (brêd'ing), the art of improving races or breeds of domestic animals, or modifying them in certain directions, by continuous attention to their pairing in conjunction with a similar attention to their feeding and general treatment. Animals (and plants no less) show great susceptibility of modification under systematic cultivation; and there can be no doubt that by such cultivation the sum of desirable qualities in particular races has been greatly increased, and that in two ways. Individual specimens are produced possessing more good qualities than can be found in any one specimen of the original stock; and from the same stock many varieties are taken characterized by

different perfections, the germs of all of which may have been in the original stock but could not have been simultaneously developed in a single specimen. But when an effort is made to develop rapidly, or to its extreme limit, any particular quality, it is always done at the expense of some other quality, or of other qualities generally, by which the intrinsic value of the result is necessarily affected. High speed in horses, for example, is only attained at the expense of a sacrifice of strength and power of endurance. So the celebrated merino sheep are the result of a system of breeding which reduces the general size and vigor of the animal, and diminishes the value of the carcass in favor of that of the wool. Much care and judgment, therefore, are needed in breeding, not only in order to produce a particular effect, but also to produce it with the least sacrifice of other qualities.

Breeding as a means of improving domestic animals has been practised more or less systematically wherever any attention has been paid to the care of live stock, and nowhere have more satisfactory results been obtained than in Britain. One of the earliest improvers in Britain was Robert Bakewell, of Dishley, in Leicestershire, who commenced his experiments about 1745, and was very successful, especially with sheep, the celebrated Dishley breed of Leicestershire sheep having since maintained a high reputation. Quantity of meat, smallness of bone, lightness of offal; in cows, yield and quality of milk; in sheep, weight of fleece and fineness of wool, have all been studied with remarkable effects by modern breeders.

Breeze, BREEZE-FLY, a name given to various flies, otherwise called gadflies, horseflies, etc.

Breezes, SEA and LAND. See Wind.

Bregenz (brä'gents), the chief town of Vorarlberg, Austrian Empire, 77 miles W. by N. of Innsbruck, beautifully situated on a slope which rises from the Lake of Constance. It is the ancient *Brigantium* and was once of importance as a fortified place. Pop. 7505.

Brehons (brê'hons), ancient magistrates among the Irish. They were hereditary, had lands assigned for their maintenance, and administered justice to their respective tribes—each tribe had one brehon—seated in the open air upon some hill or eminence. Brehon law was reduced to writing at a very early period, as is evident from the antiquity of the language in which it is written, and in the earliest manuscript

we find allusions to a revision of it said to have been made in the 5th century by St. Patrick and other learned men, who are said to have expunged from it the traces of heathenism, and formed it into a code called the *Senchus Mor*. The Brehon law was exclusively in force in Ireland until the year 1170. It was finally abolished by James I in 1605.

Breisach (brî'sâh), a small though ancient town of Southern Germany, on the Rhine, in Baden, formerly a free imperial city, and a fortress of importance down to the middle of the 18th century, often being a scene of warlike operations. It is often called Old Breisach, in opposition to New Breisach, a fortress on the opposite side of the river, in Alsace. Pop. 3537.

Breisgau (brî's'gau), one of the most fertile and picturesque districts of Germany, in the south of Baden, in the Rhine valley, containing part of the Black Forest. Chief town, Freiburg.

Breitenfeld (brî'tn-felt), a village of Germany, in Saxony, 4 miles N. of Leipzig, notable as the scene of two battles of the Thirty Years' war, the first gained by Gustavus Adolphus over Tilly and Pappenheim in 1631; the second by the Swedish general Torstenson over the Imperialists commanded by Archduke Leopold and Piccolomini in 1642.

Bremen (brâ'men), a free city of Germany, an independent member of the empire, one of the three Hanse towns, on the Weser, about 50 miles from its mouth, in its own small territory of 98 sq. miles, besides which it possesses the port of Bremerhaven at the mouth of the river. The town is partly on the right, partly on the left bank of the Weser, the larger portion being on the former. Here is the old and business section of the town, the streets of which are narrow and crooked, and lined with antique houses, and which contains the cathedral, founded about 1050, the old Gothic council-house, with the famous wine cellar below it, the town hall, the merchants' house, and the old and the new exchange. The Vorstadt, or suburbs lying on the right bank outside the ramparts of the old town, are now very extensive. The manufacturing establishments consist of tobacco and cigar factories, sugar refineries, rice mills, iron-foundries, machine-works, rope and sail works, and shipbuilding yards. Its situation renders Bremen the emporium for Hanover, Brunswick, Hesse, and other countries traversed by the Weser, and next to Hamburg it is the principal seat of the export and import and emigration trade of Ger-

many. Only small vessels can come up to the town itself; the great bulk of the shipping trade centers in Bremerhaven and Geestemünde. Bremerhaven is now a place of over 20,000 inhabitants, has docks capable of receiving the largest vessels and is connected by railway with Bremen, where the chief merchants and brokers have their offices. The chief imports are tobacco, raw cotton and cotton goods, wool and woollen goods, rice, coffee, grain, petroleum, etc., which are chiefly reexported to other parts of Germany and the Continent. Pop. of town (1910) 246,827; of total territory 263,440.

Bremen was made a bishopric by Charlemagne about 788, was afterwards made an archbishopric, and by the end of the fourteenth century had become virtually a free imperial city. The constitution is in most respects republican. The legislative authority is shared by a senate of sixteen citizens elected for life, and an assembly of 150 citizens elected for six years. The executive lies with the senate and senatorial committees.

Bremer (brâ'mer), FREDERIKA, a Swedish novelist, was born near Abo in Finland in 1802 and died in 1865. She early visited Paris, and at subsequent periods of her life, up to 1861, she traveled in America, England, Switzerland, Italy, Turkey, Greece, and Palestine. She also resided for some time in Norway. She wrote an account of her travels; but her fame chiefly rests on her novels, which were translated into German and French, and into English by Mary Howitt. Among the chief of these are *Neighbors*, *The President's Daughters*, *Nina*, and *Strife and Peace*.

Brenham (bren'am), a city, capital of Washington Co., Texas, 93 miles E. of Austin. It has important cotton industries, etc., and is a shipping point for cotton, grain and livestock. Pop. 4718.

Brenner (bren'ner), a mountain in the Tyrolean Alps between Innsbruck and Sterzing; height, 6777 feet. The road from Germany to Italy, traversing this mountain, reaches the elevation of 4658 feet, and is one of the lowest roads practicable for carriages over the main chain of the Alps. A railway through this route was opened in 1867.

Brennus (bren'nus), the name or title of several princes of the ancient Gauls, of whom the most famous was the leader of the Senones, who invaded the Roman territory about the year 390 B.C. He conquered Etruria from Ravenna to Picenum, besieged Clusium, defeated the Romans near the

Allia, sacked Rome, and besieged the capitol for six months, but ultimately retired on payment of a large amount of gold. According to Polybius the Gauls returned home in safety with their booty; but according to Livy, Brennus was disastrously defeated by Camillus, a distinguished Roman exile who arrived in time to save the capitol.

Brent, CHARLES HENRY, a Protestant Episcopal prelate, born at New Castle, Ontario, April 9, 1862; educated at Trinity College, Toronto. He held charges in Buffalo and Boston and was elected bishop of the Philippines in 1901. In 1908 he declined the bishopric of Washington. His works include *With God in the World* (1889); *The Consolations of the Cross* (1902); *With God in Prayer* (1907); *The Sixth Sense* (1912).

Brenta (bren'ta), a river in North Italy, falling after a winding course of 112 miles, into the Adriatic. Formerly its embouchure was at Fusina, opposite Venice; but a new course was made for it.

Brentano (bren-tá'nō), CLEMENS, a German poet and romancer, born in 1777; died in 1842. He studied at Jena, and resided successively at Frankfort, Heidelberg, Vienna, and Berlin. In 1818 he retired to the convent of Dülmen, in Münster, and the latter years of his eccentric life were spent at Ratisbon, Munich, and Frankfort-on-the-Main. He had a powerful imagination, and his works display an elaborate satirical humor, but a curious vein of mysticism and misanthropy run through them. He was the brother of Elizabeth von Arnim. Goethe's 'Bettina.' Among his principal works are—*Satires and Poetical Fancies*; *Ponce de Leon*, drama; *The Founding of Prague*, drama; *History of the Brave Caspar and the Fair Annerl*, an admirable novelette; *Gokel, Hinkel, und Gakeleia*, a satire on the times, etc.

Brentford (brent'ford), a manufacturing town of Middlesex, England, 7 miles w. of London, with saw-mills, pottery-works, foundries, etc., and great waterworks for London. Here Edmund Ironside defeated Canute in 1016; and Prince Rupert, Colonel Hollis, in 1642. Pop. (1911) 16,584.

Brent Goose (*Anser brenta* or *ber-nicla*), a wild goose, smaller than the common barnacle goose and of much darker plumage, remarkable for length of wing and extent of migratory power, being a winter bird of passage in France, Germany, Holland, Great Britain, the United States, Canada, etc. It breeds in high northern latitudes;

it feeds on drifting sea-weeds and saline plants, and is considered the most delicate for the table of all the goose tribe.

Brescia (brá'shè-a; Latin, *Brixia*), a city of North Italy, capital of the province of the same name, is beautifully situated at the foot of the Alps, and is of a quadrilateral form, about 4 miles in circuit. Its public buildings, particularly its churches, are remarkable for the number and value of their frescoes and pictures. Among the chief edifices are the new cathedral, a handsome structure of white marble, begun in 1604, the Rotonda, or old cathedral, the town-hall (La Loggia), and the Broletto, or courts. The city contains a museum of antiquities, picture-gallery, botanic garden, a fine public library, a theater, hospital, etc. An aqueduct supplies water to its numerous fountains. Near the town are large ironworks, and its firearms are esteemed the best that are made in Italy. It has also silk, linen, and paper factories, tan-yards, and oil mills, and is an important mart for raw silk. Brescia was the seat of a school of painting of great merit, including Alessandro Bonvicino, commonly called 'Il Moretto,' who flourished in the 16th century. The city was originally the chief town of the Cenomanni, and became the seat of a Roman colony under Augustus about B.C. 15. It was burned by the Goths in 412, was again destroyed by Attila, was taken by Charlemagne in 774, and was declared a free city by Otto I of Saxony in 936. In 1426 it put itself under the protection of Venice. In 1796 it was taken by the French, and was assigned to Austria by the Vienna treaty of 1815. In 1849 its streets were barricaded by insurgents, but were carried by the Austrians under General Haynau. It was ceded to Sardinia by the treaty of Zürich, 1859. Pop. 70,614. The province has an area of 1845 sq. miles; pop. 841,765.

Breslau (bres'lou), a large city in the German Empire and in the Prussian dominions, ranking with Berlin, Hamburg, Leipzig, Cologne, and Dresden. It is the capital of the province of Silesia, and is situated on both sides of the Oder. The public squares and buildings are handsome, and the fortifications have been converted into promenades. The cathedral, built in the 12th century, and the Rathhaus, or town hall, a Gothic structure of about the 14th century, are among the most remarkable buildings. There is a flourishing university, with a museum, library of 400,000 volumes, observatory, etc. Breslau has manufactures of machinery, railway

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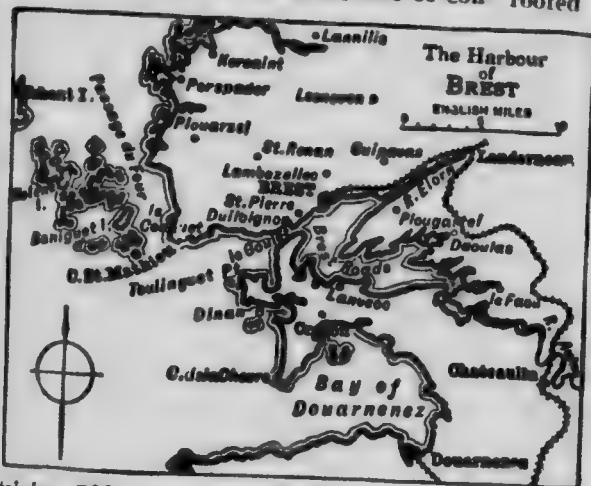
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carriages, furniture and cabinet ware, cigars, spirits and liqueurs, cotton and woolen yarn, musical instruments, porcelain, glass, etc., and carries on an extensive trade. Breslau was the seat of a bishopric by the year 1000; an independent duchy from 1103 to 1335; then belonged to Bohemia; and was ceded to Austria in 1527. In 1741 it was conquered by Frederick II of Prussia. Pop. (1910) 511,891.

Bressay (bress'á), one of the Shetland Isles, E. of Mainland, from which it is separated by Bressay Sound, about 6 miles long and $1\frac{1}{2}$ in breadth. Its line of coast is rocky and deeply indented; its interior is hilly and largely covered with peat-moss. Seafishing is the principal occupation, kelp and hosiery are manufactured, and quarries of coarse slate are wrought. Pop. about 800.

Brest, a seaport in the N. W. of France, department of Finistère. It has one of the best harbors in France, and is the chief station of the French marine, having safe roads capable of con-



taining 500 men-of-war in from 8 to 15 fathoms at low water. The entrance is narrow and rocky, and the coast on both sides is well fortified. The design to make it a naval arsenal originated with Richelieu, and was carried out by Duquesne and Vauban in the reign of Louis XIV, with the result that the town was made almost impregnable. Brest stands on the summit and sides of a projecting ridge, many of the streets being exceedingly steep. Several of the docks have been cut in the solid rock, and a breakwater extends far into the roadstead. The manufactures of Brest are inconsiderable, but it has an extensive trade in cereals, wine, brandy, sardines, mackerel, and colonial goods. It is connected with America by

a cable terminating near Duxbury, Mass. **Brest-Litovsk** (brest-lít-ovsk'), a fortified town of Russia, prov. of Grodno, on the Bug. It was captured by the Germans in August, 1915, during the European war, and it was here that the delegates from Russia and the Central powers met to discuss peace terms in 1917 and 1918. The population before the war was about 48,000.

Brest-summer, BREAST-SUMMER, or BRESSOMER, in building, a beam or summer placed horizontally to support an upper wall or partition, as the beam over shop windows; a lintel.

Bretagne (bré-tán-yé). See *Brittany*.

Bretèche, BRETESCHE (brá-tesh'), a name common to several wooden crenellated, and roofed erections, used in the middle ages in sieges by the assailants to afford protection while they were undermining the walls, and by the besieged to form defenses behind breaches. Later, the name was given to a sort of roofed wooden balcony or cage, crenellated and machicolated, attached by corbels, sometimes immediately over a gateway.

Bretigny (bré-tén-yé), a village of France, dep. Eure-et-Loire. By the treaty of Bretigny (8th of May, 1360), between Edward III of England and John II of France, the latter who had been taken prisoner at Poitiers, recovered his liberty on a ransom of 3,000,000 crowns, while Edward renounced his claim to the crown of France, and relinquished Anjou and Maine, and the greater part of Normandy, in return for Aquitaine, Gascony, Poitou, Saintonge, Périgord, Limousin, etc.

Breton de Los Herreros (bre-ton' de los er-er'ós), DON MANUEL, a popular Spanish poet, born in 1800; died in 1873. He furnished the Spanish stage with more than 150 pieces, original and adapted, besides writing lyrical and satirical poems, etc.

Bret'ons, the inhabitants of Brittany.

Bretts and Scots, LAWS OF, the name given in the 13th century to a code of laws in use among the Celtic tribes in Scotland, the Scots being the Celts north of the Forth and Clyde, and the Bretts being the remains of the British inhabitants of the kingdom of Cambria, Cumbria, or Strath-

clyde, and Reged. Edward I issued in 1306 an ordinance abolishing the usages of the Scots and Bretta. Only a fragment of them has been preserved.

Bretwalda (bret-wál'da), a title applied to one of the Anglo-Saxon tribe-chiefs or kings, who it is supposed was from time to time chosen by the other chiefs, nobility, and aldermen to be a sort of dictator in their wars with the Britons.

Breughel (breu'hel), the name of a celebrated Dutch family of painters, the first of whom adopted this name from a village not far from Breda. This was Pieter Breughel (sixteenth century), also called, from the character and subject of most of his representations, the Droll or the Peasants' Breughel. He left two sons—Pieter and Jan. The former (1565-1625) is commonly known as the Younger Breughel, though he also obtained the name of Hell Breughel, from the many scenes painted by him in which devils and witches appear. His *Orpheus Playing on the Lyre before the Infernal Deities* and *Temptation of St. Anthony* are especially noteworthy in the history of grotesque art. The former picture hangs in the gallery of Florence. The second brother, Jan (1568-1625), known as Velvet Breughel, or Flower Breughel, was distinguished for his landscapes and small figures. He also painted in co-operation with other masters, his *Four Elements* and other pictures being the joint work of Rubens and himself. Later members of his family are Ambrose, director of the Antwerp Academy of Painting between 1635 and 1670; Abraham, who for a time resided in Italy, and died in 1690; the brother of the latter, John Baptist, who died in Rome; and Abraham's son, Caspar Breughel, known as a painter of flowers and fruits.

Breve (brév), in music, a note formerly square, as ; but now of an oval shape, with a line perpendicular to the staff on each of its sides: . For nearly two centuries it was the musical unit of duration, but has since been supplanted by the semibreve, the breve being now of comparatively rare occurrence.

Brevet (brev-et'), in the United States and Britain applied to a commission to an officer, entitling him to a rank in the army higher than that which he holds in his regiment, without, however, conferring the right to a corresponding advance of pay.

Breviary (brev'i-a-ri), the book which contains prayers or offices to be used at the seven canonical hours of matins, prime, tierce, sext, none, vespers, and compline by all in the order

of the Church of Rome or in the enjoyment of any R. Catholic benefice. It is not known at what time the use of the breviary was first enjoined, but the early offices were exhaustive from their great length, and under Gregory VII (1073-85) their abridgement was considered necessary; hence the original of the breviary (Lat. *brevis*, short). In 1568 Pius V published that which has remained, with few modifications, to the present day. The Roman breviary, however, was never fully accepted by the Gallican Church until after the strenuous efforts made by the Ultramontanes from 1840 to 1864. The Psalms occupy a large place in the breviary; passages from the Old and New Testament and from the fathers have the next place. All the services are in Latin and their arrangement is very complex. The English Book of Common Prayer is based on the Roman Breviary.

Brevier (bre-vér'), a size of printing type between bourgeois and minion, often used as the body type of reference books; known also as 'eight point'.

Brevipennatæ (brev-i-pen-ná'tæ), name sometimes given to a shortwinged division of Natatores, or swimming birds. It includes the penguins, auks, guillemots, divers and grebes.

Brevipennes (brev-i-pen'ez), Cuvier's classification the first family of his order Grallæ or wading birds, and equivalent to the order Cursores or section Ratitæ of other naturalists. The ostrich, emu, cassowary, dodo, etc., belong to this tribe.

Brewer (brú'er), E. COBHAM, an English author, born in London in 1810; died 1897. He was graduated at Cambridge in 1835, and took priest's orders in the English church in 1837. His works include *Dictionary of Phrase and Fable*, *Reader's Hand Book*, *Dictionary of Miracles*, *Guide to Science*, *History of France*, *History of Germany*, etc.

Brewer, DAVID J., an American legislator, born at Smyrna, As Minor, in 1837, graduated at Yale University, studied law, and in 1870 became justice in the Supreme Court of Kansas. Appointed to the United States Circuit Court in 1884, he was made a justice of the United States Supreme Court in 1889. He was president of the Venezuela boundary commission of 1896 and a member of the Venezuela arbitration tribunal of 1898. He died March 18, 1910.

Brewer, THOMAS MAYO, ornithologist, born at Boston, Massachusetts, in 1816; died in 1890. He gra

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uated in medicine, became a journalist, and in 1857 a member of a book-publishing firm. He wrote *Oology of North America*, was one of the authors of *History of North American Birds*, and edited Wilson's *Birds of America*.

Brewing (brō'ing), the process of extracting a saccharine solution from malted grain and converting the solution into a fermented alcoholic beverage called *ale* or *beer*. The preliminary process of *malt* (often a distinct business to that of brewing) consists in promoting the germination of the grain for the sake of the saccharine matter into which the starch of the seed is thus converted. The barley or other grain is steeped for about two days in a cistern and then piled in a heap, or *couch*, which is turned and re-turned until the radicle or root, and acrospire or rudimentary stem, have uniformly developed to some little extent in all the heap of grain. This treatment lasts from seven to ten days, by which time the grain has acquired a sweet taste; the life of the grain being then destroyed by spreading the whole upon the floor of a kiln to be thoroughly dried. At this point begins the brewing process proper, which in breweries is generally as follows: The malt is crushed or roughly ground in a malt mill, whence it is carried to the mashing machine, and there thoroughly mixed with hot water. The mixture is now received by the mash-tun—a cylindrical vessel with a false perforated bottom held about an inch from the true one. In the mash-tun the useful elements are extracted from the malt in the form of the sweet liquor known as wort, and the tun, therefore, is fitted with an elaborate system of revolving rakes for thoroughly mixing the malt with hot water. The mixing completed, the mash-tun is covered up and allowed to stand for about three hours, when the taps in the true bottom are opened and the wort or malt-extract run off. The hops are now added, and the whole boiled for about two hours, the boiling, like the addition of hops, tending to prevent acetous and putrefactive fermentation. When sufficiently boiled the contents of the copper are run into the hop-back—a long, rectangular vessel with a false bottom 8 or 9 inches from the true bottom. The hot wort leaving the spent hops in the hop-back runs through the perforations in the false bottom and thence into the cooler—a large flat vessel where the worts are cooled to about 100° Fah. From the cooler the liquor is admitted to the refrigerator—a shallow rectangular

Brewing

vessel, which reduces the temperature to almost that of the cold water, or about 58°. The worts are next led by pipes into the large wooden fermenting tuns, where yeast or barm is added as soon as the wort begins to run in from the refrigerator. During the operation of fermentation, by which a portion of the saccharine matter is converted into alcohol, the temperature rises considerably, and requires to be kept in check by means of a coil of copper piping with cold water running through it lowered into the beer. When the fermentation has gone far enough, the liquor has been allowed to settle, the beer becomes comparatively clear and bright, and may be run off and filled into the casks or into

vats. Various beers are brewed from grain and are generally classed under the names of *pilsener*, *porter*, *ale*, and *beer*. All are brewed in a condition charged with carbonic acid gas, and are sparkling and foaming beverages. *Pilsener* is highly effervescent, and has a slightly, slightly acid taste. *Weiss beer* is a product in a high state of strength after fermentation, and it also possesses a long life and a prickly, somewhat sour, taste. *Ale* was originally made from barley malt and yeast alone, and the use of hops was first introduced in Germany, which is still a great brewing country. One of the kinds of German beer now widely known and consumed is *lager beer*—that is, *store beer*, the name being given to it because it is usually kept for four to six months before being used. In brewing it the fermentation is made to go on rather slowly and at a low temperature. Much *lager beer* was formerly made in America. Among the most celebrated beers are the English pale ales brewed at Burton-on-Trent. The excellence of the Burton ale depends partly on the water used, which is all drawn from wells, and contains carbonates and sulphates of lime and magnesia in large quantities and partly on the method of brewing. The English bitter beer made for home consumption is less bitter than that which is sent abroad, at least as brewed by the best brewers; but a good part of the beer sold under this name is of poor quality and would have little flavor were it not for the hops. Porter, which is very largely made in London, as also in Dublin, is of a very dark color, this color being obtained by the use of a certain proportion of malt subjected to a heat sufficient to scorch or blacken it. The prohibition amendment, which went into effect January 16, 1920, put an end to the brewing industry in America. (See *Prohibition*.)

The manufacture of ale or beer is of

very high antiquity. Herodotus ascribes the invention of brewing to Isis, and it was certainly practised in Egypt. Xenophon mentions it as being used in Armenia, and the Gauls were early acquainted with it. Pliny mentions an intoxicating liquor made of grain and water as common to all the nations of the west of Europe, and in England ale-booths were regulated by law as early as the 8th century. A rude process of brewing is carried on by many uncivilized races; thus chic or maize beer is made by the South America Indians, millet beer by various African tribes, etc.

Brewster (brü'ster), **BENJAMIN HARRIS**, a distinguished lawyer, born in Salem Co., New Jersey, in 1816; died in 1888. He was admitted to the Philadelphia bar in 1838, was attorney-general of Pennsylvania 1867-69, and attorney-general of the United States 1881-85, becoming notable for his prosecution of the Star Route case.

Brewster, (**FREDERICK CARROLL**, an American lawyer, born in Philadelphia, Pa., in 1825; died in 1898. He graduated at the University of Pennsylvania; was admitted to the bar in 1844 and was city solicitor of Philadelphia, 1862 to 1866, when he became judge of the Court of Common Pleas. In 1869 he was made attorney-general of Pennsylvania. He was instrumental in obtaining for the city of Philadelphia the Stephen Girard bequest.

Brewster, **SIR DAVID**, scientist, born at Jedburgh, Scotland, in 1781; studied at Edinburgh University for the church, but was attracted by the lectures of Robinson and Playfair to science. In 1807 he was an unsuccessful candidate for the mathematical chair at St. Andrews, but became in the same year M.A. of Cambridge, LL. D. of Aberdeen, and member of the Royal Society of Edinburgh, to the *Transactions* of which he contributed important papers on the polarization of light. In 1832 he was knighted and pensioned, and both before and after this time his services to science obtained throughout Europe the most honorable recognition. Among his inventions were the 'polyzonal lens' (introduced into British lighthouses in 1835), the kaleidoscope, and the improved stereoscope. His chief works are a *Treatise on the Kaleidoscope* (1829); *Letters on Natural Magic* (1831); *Treatise on Optics* (1831); *More Worlds than One* (1854); and *Lives of Euler, Newton, Galileo, Tycho Brahe, and Kepler*. He died in February, 1868.

Brialmont (brî-â-l-môp), **HENRI ALEXIS**, a Belgian military writer, born in 1821, entered the army in 1843 as lieutenant of engineers, became lieutenant-general. Among his works are *Considérations Politiques et Militaires sur la Belgique*; *Précis d'Art Militaire*; *Histoire du Duc de Wellington*, translated into English by Gleig; *Etude sur la Défense des Etats et sur la Fortification*; and many works on fortification. He died in 1903.

Brian (brî'an; surnamed *Boroimhé* or *Boru*), a famous chieftain of the early Irish annals, who succeeded to Munster in 978, defeated the Danes of Limerick and Waterford, attacked Malachi, nominal king of the whole island, and became king in his stead (1002). He was slain at the close of the battle of Clontarf, near Dublin, in 1014, after gaining a signal victory over the revolted Maelmora and his Danish allies.

Briançon (brî-âp-sôn; ancient *Brigantium*), a town and fortress of France, department of Haute-Alpes, on the right bank of the Duranc. It occupies an eminence 4284 ft. above sea-level, and has been called the Gibraltar of the Alps. Pop. 7524.

Briand (brî-and'), a French lawyer and journalist, born at Nantes in 1863, became a leading Socialist, and in 1902 was elected to the Chamber of Deputies. In 1905 he was made Minister of Instruction and Worship, later Minister of Justice, and Prime Minister in 1909, and settled the great railroad strike of 1910 by calling the men to the colors. He again became Premier in 1913 and died in 1915.

Briareus (brî-â-re-us), in Greek fable a giant with 100 arms and 50 heads, aided Jupiter (Zeus) in the war with the Titans.

Bribe (brîb), a reward given to a public officer or functionary to induce him to violate his official duty as to aid the purpose of the person bribing; especially a corrupt payment of money for the votes of electors in the choice of persons to places of trust and government. Bribery is in most countries regarded as a crime deserving severe punishment. In Britain acts amending and consolidating previous acts against bribery at elections were passed in 1854 and 1868, when it was enacted that elector petitions should be tried by a special constituted court. There have been frequent instances of bribery within recent years in the United States, and stringent preventive enactments have been passed, though such laws are rarely effective on account of the secrecy of the proceedings.

and the difficulty of obtaining satisfactory evidence.

Brick, a sort of artificial stone, made principally of argillaceous earth formed in molds, dried in the sun, and baked by burning, or, as in many Eastern countries, by exposure to the sun. Sun-dried bricks of great antiquity have been found in Egypt, Assyria, and Babylonia, and in the mud walls of old Indian towns, and are now much used in Mexico and others of the Latin American countries. Under the Romans the art of making and building with bricks was brought to great perfection, and the impressions on Roman bricks, like those on the bricks of Babylonia, have been of considerable historic value. The Roman brick was afterwards superseded in England by the smaller Flemish make. Of the various clays used in brickmaking, the simplest, consisting chiefly of silicates of alumina, are almost infusible, and are known as fire-clays, the Stourbridge clay being specially famous. Of such clays fire-bricks are made. Clays containing lime and no iron burn white, the colors of others being due to the presence in varying proportions of ferric oxide, which also adds to the hardness of bricks. The clay should be dug in autumn and exposed to the influence of frost and rain. It should be worked over repeatedly with the spade and tempered to a ductile, homogeneous paste, and should not be made into bricks until the ensuing spring. The making of bricks by hand in molds is a simple process. After being made and dried for about nine or ten days they are ready for the burning, for which purpose they are formed into *kilns*, having flues or cavities at the bottom for the insertion of the fuel, and interstices between them for the fire and hot air to penetrate. Much care is necessary in regulating the fire, since too much heat vitrifies the bricks and too little leaves them soft and friable. Bricks are now largely made by machines of various construction. In one the clay is mixed and comminuted in a cylindrical pug-mill by means of rotatory knives or cutters working spirally and pressing the clay down to the bottom of the cylinder. From this it is conveyed by rollers and forced through an opening of the required size in a solid rectangular stream, which is cut into bricks by wires working transversely. Machine-made bricks are heavier, being less porous than hand-made bricks, and are more liable to crack in drying; but they are smoother, and, when carefully dried, stronger than the hand-made ones.

Bridewell (brid'wel), in Blackfriars, London, formerly used as

a house of correction. The building, of which only the hall, treasurer's house, and offices remain, takes its name from a well once existing between Fleet Street and the Thames, and dedicated to St. Bride. Henry VIII built on this site, in 1522, a palace for the accommodation of the Emperor Charles V, which was afterwards converted by Edward VI into a hospital to serve as a workhouse for the poor and as a house of correction.

Bridge (brij'), a structure of stone, brick, wood, or iron, affording a passage over a stream, valley, or the like. The earliest bridges were no doubt trunks of trees, followed by suspension bridges made of tough, fibrous plants. The arch seems to have been unknown among most of the nations of antiquity. Even the Greeks had not sufficient acquaintance with it to apply it to bridge building. The Romans were the first to employ the principle of the arch in this direction, and after the construction of such a work as the great arched sewer at Rome, the *Cloaca Maxima*, a bridge over the Tiber would be of comparatively easy execution. One of the finest examples of the Roman bridge was the bridge built by Augustus over the Nera at Narni, the vestiges of which still remain. It consisted of four arches, the longest of 142 feet span. The most celebrated bridges of ancient Rome were not generally, however, distinguished by the extraordinary size of their arches, nor by the lightness of their piers, but by their excellence and durability. The span of their arches seldom exceeded 70 or 80 feet, and they were mostly semicircular, or nearly so. The Romans built bridges wherever their conquests extended, and in Britain there are still a number of bridges dating from Roman times. One of the most ancient post-Roman bridges in England is the Gothic triangular bridge at Croyland, in Lincolnshire, said to have been built in 800, having three archways meeting in a common center at their apex, and three roadways. The longest old bridge in England was that over the Trent at Burton, in Staffordshire, built in the twelfth century, of squared freestone, and recently pulled down. It consisted of thirty-six arches, and was 1545 feet long. Old London Bridge was commenced in 1176, and finished in 1209. It had houses on each side like a regular street till 1756-58. In 1831 it was altogether removed, the new bridge, which had been begun in 1824, having then been finished. The art of bridge-building made no progress after the destruction of the Roman empire till the eighteenth century, when the French architects began to in-

roduce improvements, and the constructions of Perronet (Nogent-sur-Seine; Neuilly; Louis XVI bridge at Paris) are masterpieces. Within the last half century or so the use of steel and iron, the immense development of all mechanical contrivances, and the great demand for railway bridges and viaducts have given a great stimulus to invention in this department.

Stone bridges consist of an arch or series of arches, and in building them the properties of the arch, the nature of the materials, and many other matters have to be carefully considered. It has been found that in the construction of an arch the slipping of the stones upon one another is prevented by their mutual pressure and the friction of their surfaces; the use of cement is thus subordinate to the principle of construction in contributing to the strength and maintenance of the fabric. The masonry or rock which receives the lateral thrust of an arch is called the *abutment*, the perpendicular supports are the *piers*. The width of an arch is its *span*; the greatest span in any stone bridge is about 250 feet. A one-span bridge has, of course, no piers. In constructing a bridge across a deep stream it is desirable to have the smallest possible number of points of support. Piers in the waterway are not only expensive to form, but obstruct the navigation of the river, and by the very extent of resisting surface they expose the structure to shocks and the wearing action of the water. In building an arch, a timber framework is used called the *center* or *centering*. The *centering* has to keep the stones or *voussoirs* in position till they are keyed in, that is, all fixed in their places by the insertion of the keystone.

The first iron bridges were erected from about 1777 to 1790. The same general principles apply to the construction of iron as of stone bridges, but the greater cohesion and adaptability of the material give more liberty to the architect, and much greater width of span is possible. At first iron bridges were erected in the form of arches, and the material employed was cast-iron; but the arch has now been generally superseded by the beam or *girder*, with its numerous modifications; and wrought-iron or steel is likewise found to be much better adapted for resisting a great tensile strain than cast-metal. Numerous modifications exist of the beam or girder, as the *lattice-girder*, *bowstring-girder*, etc.; but of these none is more interesting than the *tubular* or hollow girder, first rendered famous from its employment by Robert Stephenson in the construction of the railway

bridge across the Menai Strait, and connecting Anglesey with the mainland of North Wales. This is known as the Britannia Tubular Bridge. The tubes are of a rectangular form, and constructed of riveted plates of wrought-iron, with rows of rectangular tubes or cells for the floor and roof respectively. The bridge consists of two of these enormous tubes or hollow beams laid side by side, one for the up and the other for the down traffic of the railway, and extending each about a quarter of a mile in length. Other tubular bridges of importance are the Conway Bridge, over the river Conway, an erection identical in principle with the Britannia Bridge, but on a smaller scale; the Brotherton Bridge over the river Aire; the tubular railway bridge across the Damietta branch of the Nile, which has this peculiarity, that the roadway is carried above instead of through the tubes; and the Victoria Bridge over the St. Lawrence, Canada. In many respects this structure is even more remarkable than the Britannia Bridge, being supported by twenty-four piers, and nearly 2 miles in length, or about five and a half times that of the bridge across the Menai Strait. A girder railway bridge across the Firth of Tay at Dundee was opened in 1887, being the second built at the same place, after the first had given way in a great storm. It is 2 miles 73 yds. long, has 85 spans, is 77 ft. high, and carries two lines of rails.

Suspension-bridges, being entirely independent of central supports, do not interfere with the river, and may be erected where it is impracticable to build bridges of any other kind. The entire weight of a suspension-bridge rests upon the piers at either end from which it is suspended, all the weight being below the points of support. Such bridges always swing a little, giving a vibratory movement which imparts a peculiar sensation to the passenger. The modes of constructing these bridges are various. The roadway is suspended either from chains or from wire-ropes, the ends of which require to be anchored; that is, attached to the solid rock or masses of masonry or iron. The most notable examples are the great cantilever bridge over the St. Lawrence at Quebec, 1800 feet in length, and the Forth bridge in Scotland, the three cantilevers of which measure a mile in length. A new material for bridge building is concrete, now taking the place of stone and iron in arch bridges. Among notable examples of this type may be named that over the Wissahickon ravine in Philadelphia. The Cincinnati bridge over the Ohio has a span of 1057 feet. A suspen-

tion-bridge of great magnitude, connecting the city of New York with Brooklyn, was opened in 1883. The central or main span is 1595½ feet from tower to tower, and the land spans between the towers and the anchorages 930 feet each; the approach on the New York side is 2402 feet long, and that on the Brooklyn side 1901 feet, making the total length 5989 feet. Since its completion three other bridges across the East River have been constructed, the Manhattan bridge, total length of roadway 6855 feet, width of bridge 122 ft. 6 in.; cost \$26,000,000; the Williamsburg Bridge, 7308 feet long, 118 ft. wide, and on October 1, 1915, the steel arms of the bridge spanning Hell Gate, on the East River, New York City, were locked and the largest self-supporting arch in the world, under erection since the beginning of the year, was completed. The bridge forms a link in the chain of construction connecting the Pennsylvania and the New York, New Haven and Hartford systems. The span of the bridge is 1016 feet, 10 inches. The entire weight of the loaded bridge is 38,000 tons, while the dead weight per lineal foot is twenty-six tons. The bridge was designed and constructed under the charge of Gustav Lindenthal, at a cost of \$12,000,000.

Bridge, a game of cards for four persons, differing from whist (q. v.) (1) in that no trump is turned, the dealer naming the trump after examining his cards, or leaving it to his partner to declare; and (2) particularly because only three players actually engage in playing the hand, the cards of the dealer's partner being exposed as a dummy hand and played by the dealer in conjunction with his own. The score also differs from that in whist; each trick in excess of six counts, with spades 2 points; with clubs, 4; with hearts, 8; with "no trumps," 12. These values may be increased by "doubling" and "redoubling." A game consists of 30 points, not counting the honor scores, which vary in value with the trump declaration and the relative distribution of the honor cards between the two partners who hold a preponderance of honors. A grand slam (taking all 13 tricks in a hand) also counts 40, and a little slam 20, in honors. A rubber consists of 3 games, the partners winning 2 of the 3, adding 100 points to their honor score. The honor score is not affected by doubling or redoubling, which applies to the trick score only.

The Cantilever Bridge is built on the principle of the bracket, or fixed base of support on which the structure is sustained. Of this type of bridge a notable example is that which crosses the Firth of Forth in Scotland, it being one of the largest bridges in the world. Its total length, including piers, is 8296 feet, or a little over 1½ miles, while its two main spans are each 1700 feet in length. Another splendid example of this type is the great railroad bridge over the St. Lawrence River at Quebec, notable for the disasters attending its erection. A large part of the structure fell in 1907, causing considerable loss of life. In 1916 the connecting span, while being lifted into place, slipped and fell to the river bottom. In 1917 a new span was successfully lifted into place and the construction of the magnificent structure thus assured.

Some of the most striking developments in the art of bridge building belong to the United States, where an enormous railroad system, traversing a country of great rivers and ravines, has given an active impetus to the art. The main characteristics of American bridges are simplicity and boldness of design and the reduction of the number of members by the use of open trusses composed of simple systems, thus reducing the resistance to wind pressure below that usual in European

Bridgeman (brij'man), LAURA, a blind deaf-mute, born in Hanover, N. H., in 1829; died in 1889. When two years of age a severe illness deprived her of the senses of sight, hearing, and smell. She was put under the care of Dr. Howe, of Boston, and the history of the methods by which she was gradually taught to read, write, and eventually perform most of the ordinary duties and even some of the accomplishments of life, is a very interesting one.

Bridge'north, or BRIDGORTH, a town of Shropshire, England, 19 miles S.E. from Shrewsbury, on the Severn. Pop. (1911) 5768.

Bridgeport (brij'port), a city, one of the capitals of Fairfield Co., Connecticut, 58 miles N.E. of New York, on an arm of Long Island Sound, with a large coasting trade, but chiefly supported by its manufactures. These include the large sewing-machine factories of Wheeler & Wilson Co. and Elias Howe, large cartridge, ordnance, and graphophone works, etc. It has a considerable coasting trade. Pop. 102,064.

Bridges

Bridges, ROBERT, poet laureate of England, born October 23, 1844; educated at Eton and at Oxford; then studied medicine at St. Bartholomew's, London. He is the author of various essays, plays and poems.

Bridget (brij'et), the name of two saints in the Roman Catholic Church.—The first, better known as **St. BRIDE**, was born in Ireland about the end of the fifth century. She was exceedingly beautiful, and to avoid offers of marriage and other temptations implored God to render her ugly, which prayer was granted. An order of nuns of St. Bride was established, which continued to flourish for centuries. St. Bride was held in great reverence in Scotland.—The second **St. BRIDGET**, or more properly **Birgit** or **Brigitte**, was the daughter of a Swedish prince, born about 1302, and died at Rome in 1373, on her return from a pilgrimage to Palestine. She left a series of mystic writings which were pronounced inspired by Gregory XI and Urban VI. Her youngest daughter, Catherine, was also canonized, and became the patron saint of Sweden.

Bridgeton (brij'ton), a city and port of entry in New Jersey, situated on both sides of Cohansey Creek, 38 miles S. of Philadelphia. It is the trade center of a large agricultural region, fruit-canning being a large industry; has also wire, nail, and glass works, etc. Pop. 14,209.

Bridgetown (brij'toun), the capital of the island of Barbados, in the West Indies, extending along the shore of Carlisle Bay, on the S.W. coast of the island, for nearly 2 miles. Its appearance is very pleasing, the houses being embosomed in trees, while hills of moderate height rise behind, studded with villas. Bridgetown is the residence of the governor-general of the Windward Islands. Pop. about 22,000.

Bridgewater (brij'wa-tér), or **BRIDGEWATER**, a municipal borough and port in the county of Somerset, England, on the Parret, which is navigable as far up as the town for small vessels. A considerable shipping trade is carried on, chiefly coastwise. Bricks are made here in great quantities, especially bath bricks. Pop. (1911) 16,802.

Bridgewater, Plymouth Co., Massachusetts, 27 miles S. of Boston. It is an important educational town, and has large foundries and machine shops and other industries. Pop. 9000.

Bridgewater, FRANCIS EGERTON, DUKE OF, an English nobleman, born in 1736. His estate of

Worsley contained valuable coal mines and with the view of establishing a communication between these and the town of Manchester, at 7 miles distance, employed Brindley to construct a navigable canal, which, after having encountered much opposition and ridicule, triumphantly carried through. He was the chief promoter of other excellent works of the same kind. He died in 1803. See *Brindley*.

Bridgewater Treatises, a series of books, the outcome of the will of the Rev. Henry Francis, Earl of Bridgewater, who died in 1829, bequeathing a sum of £80,000 which should be paid to the persons chosen to write and publish 10 copies of a work on the power, wisdom and goodness of God as manifested in creation. The result was eight works on animal and vegetable physiology, astronomy, geology, the history, habits, instincts of animals, etc., which at the time enjoyed great popularity. The names of the writers are Dr. Chalmers, Dr. Kidd, Dr. Whewell, Sir Charles Lyell, Dr. Roget, Dr. Buckland, Rev. William Kirby, and Dr. Prout.

Bridle (bri'dl), the headstall, bit, and reins by which a horse is governed.

Bridlington (usually pronounced Buri'ton), a town of Yorkshire, England, agreeably situated about a mile from the sea, 37 miles N.E. from York, with considerable trade. Pop. 14,334. Half a mile from Bridlington is *Bridling Quay*, a favorite sea-bathing resort, having also mineral waters resembling those of Scarborough and Cheltenham.

Bridport, a seaport in Dorsetshire, England, between the rivers Bride or Brit and Asker, which unite a little below the town, and forms a safe and commodious harbor for small vessels. There are manufactures of silk thread, twine, lines, sail-cloth, fish-nets, etc. Pop. 5919.

Brief (brëf), which comes from the Latin *brevis*, short, denotes a brief or short statement or summary, particularly the summary of a client's case which the solicitor draws up for the instruction of counsel. A brief also means, in law, an order emanating from the superior courts. A *papal brief* is a sort of pastoral letter in which the pope gives his decision on some matter which concerns the party to whom it is addressed. The brief is an official document, but of a less public character than the bull.

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Brieg (brëh), a town of Prussia, province of Silesia, on the left bank of the Oder, which is here crossed by a long traffic bridge, 26 miles S. E. from Breslau, with a considerable transit trade and some manufactures, chiefly linens, woollens, cottons, leather, etc. Pop. 24,114.

Briel (brël), or **BRIELLE** (brë-el'), sometimes called the *Brill*, a fortified seaport of Holland, near the mouth of the Maas, province of South Holland. The taking of Briel in 1572 was the first success of the revolted Netherlanders in their struggle with Philip II of Spain. The famous Admiral Van Tromp was born here. Pop. 4107.

Brienne (brë-an), a small town of France, dep. Aube. In the military academy which formerly existed here Napoleon received his early military training. Brienne was also the scene of a bloody battle between Blücher and Napoleon (29th Feb. 1814). Pop. about 1700.

Brienne, JOHN OF, a celebrated Crusader, born in 1148; died in 1237; was son of Erard II, Count of Brienne; was present at the siege of Constantinople in 1204, and afterwards, in 1209, married the granddaughter and heiress of Amaury, King of Jerusalem. Brienne thus obtained an empty title which he afterwards ceded to the Emperor Frederick II. Later on he was again formally associated with Baldwin II as joint emperor of the Latin empire in the East. After a series of heroic exploits in defense of his dominions, in 1237 he resigned his crown to retire into a monastery, where he died.

Brierly Hill (brî'er-ly), a town in Staffordshire, England, on the Stour. It lies in a rich mineral district, and carries on considerable industry. Pop. (1911) 12,264.

Brieuc, St. (san brë-eu), a seaport town of France, dep. Côtes du Nord, about a mile above the mouth of the Gouët. It is the seat of a bishop and has a very ancient cathedral. It manufactures cottons, woolen stuffs, paper, etc. Pop. 14,629.

Brioux (brë-eu), **EUGÈNE**, a French dramatist, born at Paris, 1858. He has produced many plays, chiefly sociological. His *Les Avariés*, portraying the horrible consequences of the sowing of 'wild oats,' has gained wide popularity in America under the title of *Damaged Goods*.

Brig, a sailing vessel with two masts rigged like the foremast and mizen-mast of a full-rigged ship.

Brigade (brî-gad). In the United States army three regiments of infantry or cavalry usually constitute a brigade, commanded by a brigadier-general. A number of brigades form a division; several divisions an army corps. In most European armies an infantry brigade consists of two regiments, each of three battalions.

Briggs (brî-gs), **CHARLES A.**, clergyman, born in New York in 1841; professor of Hebrew in Union Theological Seminary, New York, in 1874; of Biblical Theology, 1890. He was accused of heresy from statements in his inaugural address, tried and suspended from the Presbyterian ministry until he should retract. In 1898 he was ordained priest by the P. E. bishop of New York. Author of many books. He died in 1913.



Brig.

Bright (brî-t), **JOHN**, a great English orator and politician, born at Greenbank, near Rochdale, Lancashire, Nov. 16, 1811. His father, Mr. Jacob Bright, carried on a cotton-spinning and manufacturing business of which the son became the head. He first became known as a leading spirit along with Mr. Cobden in the Anti-Corn-Law League. In 1843 he was chosen M. P. for Durham, and distinguished himself as a strenuous advocate of free trade and reform. In 1847 he sat for the first time for Manchester, but in 1857 his opposition to the war with China made him so unpopular in the constituency that he lost his seat by a large majority. He was, however, returned for Birmingham, and soon after made speeches against the policy of great military establishments and wars of annexation. In 1865 he took a leading part in the movement for the extension of the franchise, and strongly advocated the necessity of reform in Ireland. In the

American Civil war he strongly supported the North and advocated the abolition of slavery everywhere. A cotton-spinner himself, the war was disastrous to his business and the cotton industry in Lancashire, nevertheless his high moral sense refused to acquiesce in the continuance of slavery, and he was outspoken in Parliament and elsewhere in defense of Abraham Lincoln. It may be said he was one of the few parliamentarians who thus stood openly for the North against the South in the great conflict. When Gladstone formed his cabinet in 1868 John Bright was persuaded to accept the cabinet post of President of the Board of Trade. It was mainly through his influence that the act for the disestablishment of the Irish Church, the Irish Land Act and the Elementary Education Act was passed. He was devotedly attached to the idea of a United Kingdom, comprising Great Britain and Ireland and opposed Mr. Gladstone's scheme of Home Rule, which Bright felt would be the wedge that would mean eventually the separation of Ireland from the Union. He insisted that the solution of the Irish question was to be found in the encouragement of Irish industries, the ending of the rich landowners, and a comprehensive system of undenominational education in the public schools of the island. In 1886 he broke with Mr. Gladstone and joined the Liberal Unionists. He was a member of the Society of Friends. He died March 27, 1889.

Brighton (brî'tun; formerly *Bright-helmstone*); a maritime town and favorite watering-place in England, county of Sussex, 50 miles from London. It is situated on a gentle slope, protected from the north winds by the high ground of the south downs immediately behind the town, and is well built with handsome streets, terraces, squares, etc. In front of the town is a massive sea-wall, with a promenade and drive over 8 miles in length, one of the finest in Europe. Among the remarkable buildings, all of modern date, is the Pavillon, built by George IV, which cost upwards of \$5,000,000. It is in the oriental style, with numerous cupolas, spires, etc. The building and its gardens, which are open to the public as pleasure-grounds, cover about 9 acres. There is a very large and complete aquarium, and a fine iron pier. Brighton has no manufactures, and is resorted to only as a watering-place. It was about the middle of the 18th century that Dr. Russell, an eminent physician, drew attention to Brighton, which subsequently was patronized by George IV, then Prince of Wales; in this way it was converted from a decayed fishing village into a fashionable

and populous watering-place. The population in 1801 was only 7839; now it is 131,000. **Bright's Disease**, a name (derived from a Dr. Bright of London, who first described the disease, especially to that which is characterized by a granular condition of the cortical part of the kidneys and infiltration of the Malpighian bodies. The urine during life contains albumen, is of less specific gravity than natural. The disease is accompanied with weakness or pain in the loins, pale or cachectic countenance, disordered digestion, frequent urination, and dropsy. The blood contains urea, and is deficient in albumen and corpuscles. Progressive blood-poisoning induces other visceral diseases, and in the end gives rise to the cerebral turbance which is the frequent cause of death.

Brignoles (brî-n-yôl), a town in Southern France. Var, in a fertile valley celebrated for its salubrity. Pop. 3639.

Brihuega (brê-wâ'gâ), a town in Spain, in New Castile, near the Tajuna. Here in 1710 the Spaniards under Lord Stanhope were defeated by the Duke of Vendôme in the Spanish Succession war. Pop. about 3500.

Bril (brêl), the name of two brothers who distinguished themselves as landscape-painters.—**MATTHEW**, born in Antwerp in 1550; died in 1584; repatriated when a very young man to Rome, where he was employed on the galleries and as a painter of the Vatican.—**PAUL**, born about 1560; died about 1626; was of much superior talent, joined his brother in Rome, amongst other labors executed a fresco (his greatest work, 68 feet high) in the Sala Clementina of the Vatican. Paul is memorable as having done more to develop landscape-painting as an independent branch of the art. His pictures do not fall much short of those of Claude Lorraine, his great successor.

Brill (bril; *Rhombus vulgaris*), a fish resembling the turbot, but inferior in quality, and distinguished from it by its inferior breadth and by the perfect smoothness of its skin. The back is of a pale-brown color above, marked with scattered yellowish or reddish spots. It is abundant in the English Channel and is esteemed for the table.

Brillat-Savarin (brê-yâ-sâ-vâ-rin), a French writer, who, although he wrote works on political economy, archæology, and dueling, is known only by his famous book on gastronomy, the *Physiologie du Goût*, published in 1825. He was born

The pop. of the town is 131,250. The name (derived from a Dr. Bright) is based on the disease of kidney which is characterized by inflammation of the blood vessels and inflammation of the bladder. The albumen, and the blood are natural. The disease is characterized by uneasiness or cachectic condition, frequent urination. The blood is found in albumen, blood-poison, diseases, and cerebral dis-ent cause of

a town in France, dep. of the

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two brothers themselves as well, born at 1584; repaired to Rome, and resided in about 1536; much superior in Rome, and erected a large (68 feet long) the Vatican. He had done much as an inde-rt. His best short of those great successors (vulgare), a the turbot, but anguished from and by the per- The brilli-ye, marked by fish spots. It Channel, and

ya-si-và-ran), French author, works on political fueling, is now a book as pie du Gôl was born at

Brilliant

Bellay in 1755, and after holding several honorable positions as a magistrate, died at Paris in 1828.

Brilliant (bril'yant). See *Diamond*.

Brimstone (brim'stôn), a name often given to sulphur. Sulphur, in order to purify it from foreign matters, is generally melted in a close vessel, allowed to settle, then poured into cylindrical molds, in which it becomes hard, and is known in commerce as *roll brimstone* or *roll sulphur*.

Brindaban (brin-dā-ban'), a town of India, N. W. Provinces, Muttra District, right bank of the Jumna, one of the holiest cities of the Hindus, with a large number of temples, shrines, and sacred sites. Pop. 22,217.

Brindisi (brin'd-es-ē; anc. *Brundisium*), a seaport and fortified town, province of Lecce, Southern Italy, on the Adriatic, 45 miles E. N. E. of Taranto. In ancient times Brundisium was an important city, and with its excellent port became a considerable naval station of the Romans. Its importance as a seaport declined in the middle ages, and was subsequently completely lost, and its harbor blocked, until in 1870 the Peninsular and Oriental Steam Navigation Company put on a weekly line of steamers between Brindisi and Alexandria for the conveyance of mails and passengers between Europe and the East. From this cause Brindisi has suddenly risen into importance. Pop. 25,317.

Brindley (brind'li), JAMES, an English engineer and mechanic, born in 1716; died in 1772. When the Duke of Bridgewater was occupied in planning a communication between his estate at Worsley and the towns of Manchester and Liverpool by water, Brindley undertook the work, and by means of aqueducts over valleys, rivers, etc., he completed the Bridgewater Canal between 1758 and 1761, so as to form a junction with the Mersey. The other great works of this kind undertaken by him were the Grand Trunk Canal uniting the Trent and Mersey, and a canal uniting that with the Severn.

Brine (brin), water saturated with common salt. It is naturally produced in many places beneath the surface of the earth, and is also made artificially, for preserving meat, a little saltpeter being generally added to the solution.

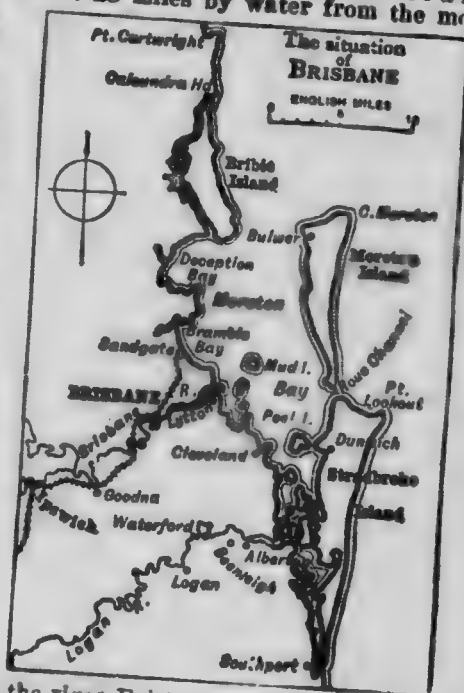
Brine-shrimp, a branchiopodous crustacean, the *Artemia salina*, about $\frac{1}{2}$ inch in length, and commonly found in the brine of salt pans previous to boiling.

Brisbane

Brinton (brin'ton), DANIEL GARRESON, ethnologist, was born in Chester Co., Pennsylvania, in 1837. After serving as surgeon in the Civil war, he settled in Philadelphia and devoted himself to American archaeology and general ethnology, on which he has left a number of valuable works. Died July 31, 1890.

Brinvilliers (bran-vél-yā), MARIE MARGUERITE D'DUBRAY, executed in 1676. She was married in 1651 to the Marquis of Brinvilliers, but after some seven or eight years of married life a young cavalry officer named Sainte-Croix inspired her with a violent passion, and being instructed by him in the art of preparing poisons, she poisoned in succession her father, her two brothers, and her sisters, chiefly, it is thought, in order to procure the means for living extravagantly with her paramour. The sudden death of Sainte-Croix, caused, it is said, by the falling off of a glass mask which he used to protect himself in preparing poisons, led to the discovery of letters incriminating Madame de Brinvilliers. She fled to England, and finally to Liège, where she was captured, conveyed to Paris, and condemned to death.

Brisbane (bris'bān), the capital of Queensland, Australia, about 25 miles by water from the mouth



of the river Brisbane, which intersects the town. Brisbane was originally settled, in

1825, as a penal station by Sir Thomas Brisbane (whence the name of the town). In 1842 the district was opened to free settlers, and on the erection of Queensland into a separate colony in 1859 Brisbane became the capital. Since then it has made great progress, and now possesses many fine public buildings. There are also botanical gardens, several public parks, etc. The climate is tropical, the annual rainfall about 55 inches. The town is the terminus of the western and southern railway system, and the port is the principal one in the colony. The chief exports are hides, wool and cotton. Population (1911) 140,374.

Brisbane (brī'shān), GENERAL SIR THOMAS MACDOUGALL, a Scotch soldier and astronomer, born in 1778. After serving in Flanders and the West Indies he commanded a brigade under the Duke of Wellington during the Peninsular war, and took part in the battles of Vittoria, Orthes, and Toulouse. In 1821 he was appointed governor of New South Wales, where his administration tended greatly to promote the prosperity of the colony. At the same time he devoted himself to astronomy, and from his observatory at Paramatta catalogued 7385 stars until then scarcely known. He died in Scotland in 1860.

Brisson (brē-sōn'), EUGENE HENRI a French statesman, born at Bourges, July 31, 1835; died in Paris, April 14, 1912. He held a number of important offices, and even when not in office he was conspicuous in public affairs. He took a prominent part in exposing the Panama scandals and acted with firmness and honesty during the Dreyfus affair in 1898.

Brissot (brē-sō'), JEAN PIERRE (also called BRISSOT DE WAREVILLE), a French political writer, born in 1754, executed October 30, 1793. He early turned his attention to public affairs, associating himself with such men as Pétion, Robespierre, Marat, etc. In 1780 he published his *Théories des Lois Criminelles*, and two years afterwards an important collection called the *Bibliothèque des Lois Criminelles*. During the revolution he made himself known as a politician and one of the leaders of the Girondist party. When the extreme views of the men of the 'Mountain' prevailed over more moderate counsels, Brissot suffered death by the guillotine.

Bristles (brīs'ls), the stiff, coarse glossy hairs of the hog and the wild boar, especially of the hair growing on the back; extensively used by brushmakers, shoemakers, sadlers, etc., and chiefly imported from Russia and Germany. Russia supplies the finest

qualities, which are worth about \$250 or \$300 per cwt.

Bristol (brīs'tol), a cathedral city of England, situated partly in Gloucestershire, partly in Somersetshire, but forming a county in itself. It stands at the confluence of the rivers Avon and Frome, which unite within the city, whence the combined stream (the Avon) pursues a course of nearly 7 miles to the Bristol Channel. The Avon is a navigable river, and the tides rise in it to a great height. The town is built partly on low grounds, partly on eminences, and has some fine suburban districts, such as Clifton, on the opposite side of the Avon and connected with Bristol by a suspension-bridge 703 feet long and 245 feet above high-water mark. The public buildings are numerous and handsome, and the number of places of worship very great. The most notable of these are the cathedral, founded in 1142 exhibiting various styles of architecture and recently restored and enlarged; St. Mary Redcliff, said to have been founded in 1293, and perhaps the finest parish church in the kingdom. Among modern buildings are the exchange, the guild hall, the council-house, the post-office, the new grammar-school, the fine arts academy, the West of England and other banks, insurance offices, etc. The charities are exceedingly numerous, the most important being Ashley Down Orphanage, for the orphans of Protestant parents, founded and still managed by the Rev. George Müller, which may almost be described as a village of orphan. Among the educational institutions are the University College, the Theological Colleges of the Baptists and Independents, Clifton College, and the Philosophical Institute. There is a school of art, and also a public library. Bristol has glassworks, potteries, soapworks, tanneries, sugar-refineries, and chemical works, shipbuilding and machinery yards. Coal is worked extensively within the limits of the borough. The export and import trade is large and varied, being one of the leading English ports in the foreign trade. Regular navigation across the Atlantic was first established here, and the *Great Western*, the pioneer steamship in this route, was built here. There is a harbor in the city itself, and the construction of new docks at Avonmouth and Portishead has given fresh impetus to the port. The construction of very large new docks was begun in 1902. Bristol is one of the healthiest of the large towns of the kingdom. It has an excellent water supply chiefly obtained from the Mendip Hills.

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Bristol

In old Celtic chronicles we find the name *Oser Oder*, or 'the City of the Osham,' given to a place in this neighborhood, a name peculiarly appropriate to the situation of Bristol, or rather of its suburb Clifton. The Saxons called it *Brigstow*, 'bridge-place.' In 1373 it was constituted a county of itself by Edward III. It was made the seat of a bishopric by Henry VIII in 1542 (now united with Gloucester). In 1831 the Reform agitation gave origin to riots that lasted for several days. The rioters destroyed a number of public and private buildings, and had to be dispersed by the military. Sebastian Cabot, Chatterton, and Southey were natives of Bristol. Pop. (1911) 357,059.

Bristol, a city of Hartford Co., Connecticut, 17 miles w. s. w. of Hartford. It has foundries and machine shops, clock, tableware, brass goods, and other factories. Pop. 13,502.

Bristol, a borough of Bucks Co., Pennsylvania, on the Delaware River, 23 miles N. of Philadelphia; has a foundry, rolling and worsted mills and large manufactures of patent leather, wallpaper, carpets, etc. Pop. 9256.

Bristol, a port of entry and capital of Bristol Co., Rhode Island, 15 miles s. s. e. of Providence, and separated from Fall River by Mount Hope Bay. Has shipyards, cotton and woolen mills, etc. Pop. 8585.

Bristol, a town of Sullivan Co., Tennessee, on the boundary between that state and Virginia. It is a railroad center and the gateway to extensive coal mining, mineral and timber operations. Here are King College, Sullins College and Virginia Interment College. The industries embrace iron, furniture, paper, hubs, spokes, clothing, etc. Pop. 7148; including the Virginia section of the town, 13,395.

Bristol Channel, an arm of the Atlantic, extending between the southern shores of Wales and the southwestern peninsula of England, and forming the continuation of the estuary of the Severn.

Bristol-stone, rock-crystal, or Bristol-diamond, small, round crystals of quartz, found in the Clifton limestone, near Bristol, England.

Britain (brit'n), or GREAT BRITAIN, names given to a European island consisting of the former three kingdoms, England, Scotland, and Wales, the name being also used as equivalent to the British Islands collectively. Great Britain and Ireland, with their connected islands, form the United Kingdom of Great Britain and Ireland, the distance

Britain

between these two islands varying from about 12 to 130 miles. Great Britain is the largest island in Europe, and the seventh largest in the world. Its nearest approach to the continent of Europe is at its s. e. extremity, where the Strait of Dover, separating it from France, is only 21 miles broad. Its length, measured on a line bearing n. by w. from Rye to Dunnet Head, is 608 miles. The breadth varies exceedingly; between St. David's Head, in Pembrokeshire, and the Naze, in Essex, it is 280 miles; between the Clyde at Dumbarton and the Forth at Alloa it is only 32 miles. The shape of Ireland is more regular than that of Great Britain, and bears a considerable resemblance to a rhomboid. Its greatest length, in a direct line north and south is 230 miles, and its greatest breadth from west to east is 180 miles. The British Isles rise from a submarine plateau connecting them geologically with the rest of Europe, of which at a remote period they must have actually formed a part. This is evidenced too by the similarity of the British fauna and flora to the continental.

Area of the British Isles.

	Sq. Miles.	Acres.
England.....	80,823	32,587,070
Wales.....	7,368	4,712,388
Isle of Man.....	357	145,585
Channel Islands.....	75	49,125
Scotland.....	29,820	19,064,659
Ireland.....	32,581	20,819,988
Total.....	180,880	77,817,680

Surface.—The north part of Britain is, for the most part, rugged, mountainous, and barren, this being the character of much of Scotland. To the n. of a line drawn from the Firth of Clyde on the w. to Stonehaven on the e. coast is the region generally known as the Highlands, divided into a northern and a southern portion by the great hollow of Glenmore through which runs the Caledonian Canal. The chief feature of the southern portion is the mountain mass of the Grampians, the culminating points of which, Bennevis and Benmacdhui, are the highest British summits, being respectively 4406 and 4296 feet. South of the Highlands lies the plain of the Forth and Clyde, a region of coal and iron, in which the chief manufacturing industries of Scotland are carried on. South of this again is the elevated region of the Southern Highlands or Southern Uplands, less rugged and more pastoral than the Highlands proper. Towards the s. e. are the Cheviot Hills, on the borders of England and Scotland. Here commences the long Pennine chain running south into England, branching off into the moun-

tains of Cumberland and the Lake district (Cumbrian Mountains), and terminating beyond the Peak of Derby, in the heart of England. The highest summit of the English mountains is in the northwest (Lake district), namely, Scawfell, 3210 ft. Further south and west is the Cambrian range, spread over the greater part of Wales, and containing, among others, the highest mountains of S. Britain—Snowdon, 3571 feet. Over great parts of England the elevations are mostly insignificant, and the general character of the country is that of undulating plains. In Ireland the most marked feature is the dreary expanse of bogs which stretches over its interior. This flatness of the interior is caused by the fact that most of the mountain masses attain their greatest elevation near the coast, and rapidly decline as they recede from it. Carn Tual, in the southwest, the culminating point of the island, is 3404 feet high.

Rivers and Lakes.—The mountains which constitute the principal watersheds of Great Britain being generally at no great distance from the W. coast, the rivers which descend from them in that direction have generally a short course, and are comparatively unimportant. The two great exceptions to this rule are the Clyde and the Severn, which owe both their volume and the length of their course to a series of longitudinal valleys, which instead of opening directly to the coast, take a somewhat parallel direction. The chief rivers entering the sea on the E. coast, proceeding from N. to S., are the Spey, Don, Dee, Tay, Forth, Tweed, Tyne, Ouse, Trent, and Thames, the last named being commercially the greatest river of the world. No river of importance empties itself either on the N. or S. coast. Owing to the great central flat of Ireland its rivers usually flow on in a gently winding course in different directions to the sea. Those of importance are not very numerous; but one of them, the Shannon, is the longest river of the British Isles, its length being about 225 miles; while the Thames is 215. The Tay (length 130 miles) is said to have the largest volume of water. The lakes of the British Isles are distinguished for beauty rather than size; the largest, but among the least interesting, is Lough Neagh, in the north of Ireland. While both Great Britain and Ireland are provided with numerous streams, which are either themselves navigable or act as the feeders of canals, the coasts supply a number of excellent harbors invaluable to the commerce of the country.

Climate.—Their maritime situation has a favorable effect on the climate of the British Isles, making it milder and more equable than that of continental countries in the same latitude. The temperature of the Atlantic, raised by the influx of the Gulf-stream, is communicated to the winds and vapors which are wafted along its surface, and the prevailing winds in Britain being from the southwest, the country is kept constantly at a relatively high temperature. The southwest winds, too, are charged with vapors and often bring rain, thus supplying the country with abundant moisture. Ireland, from its more westerly position, has these characteristics in the most marked degree, the warmth and moisture of the west winds making it markedly 'green island.' For the same reason the western shores of the islands have a milder and more equable temperature than the eastern shores, the former being on an average one or two degrees cooler in summer and several degrees warmer in winter. The range of temperature between the coldest and the warmest months is at London 26°, in England generally 34½°, while at Paris it is 30°. The range at Edinburgh is 25°, while at St. Petersburg it is 55°. The mean winter temperature at Dublin is 39°, 3 degrees higher than that of Milan, Pavia, Padua, or the whole of Lombardy.

Agriculture.—In almost every district in Great Britain where the plow is used, move farming of a superior description may be seen, and, according to Professor Thorold Rogers, 'it may be confidently averred that owing to improvement of stock and seeds, agriculture in the United Kingdom is at a higher level than in any other country.' Thorough and systematic draining, the extensive use of artificial manure, and the employment of the newest implements are among the chief features of modern British agriculture. The ensilage method of preserving grass fodder has recently been introduced, and promises to produce important results. A peculiar feature of English agriculture is distinguished from Scotch husbandry is the large amount of arable land forming permanent hayfields. These are kept fertile by heavy doses of farmyard manure and yield grass of admirable feeding qualities. Much of the land thus employed is naturally of poor quality, but by the careful management of perhaps a century has become covered with a sward of the richest green, and of most admirable feeding qualities. The great tenet of the permanent pasture is also a feature of Irish agriculture. In the rearing and fattening of stock there is

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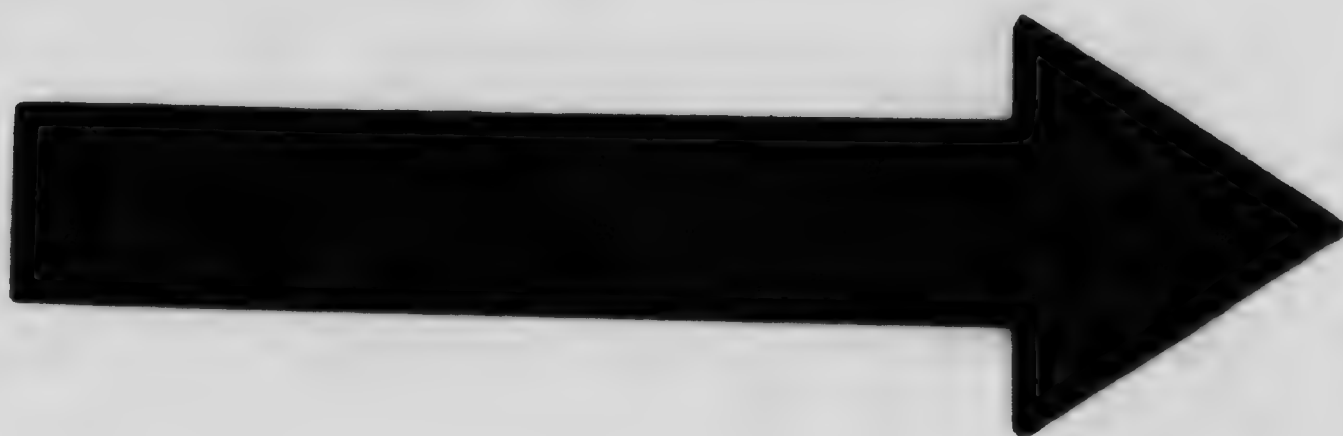
country in the world that can be com-
pared to several districts of Great
Britain. It is sufficient to mention
among horses, the race-horse, the finest
type, and the parent of the best existing
breeds of that animal; among cattle, the
shorthorns of Durham; and among
sheep, the celebrated Southdowns and
Leicesters. The principal cereal crops
grown in England are wheat, barley, and
oats, wheat covering the largest area;
the principal green crops are turnips,
potatoes, mangolds, vetches, etc. In Ire-
land and Scotland oats are by far the
principal grain crop; while the chief
green crop in Ireland is the potato, in
Scotland the turnip. Hops are grown to
a large extent in Kent, and less exten-
sively in some other parts of southern
England. The most marked feature in
the agriculture of Great Britain during
recent years is the gradual increase in
the proportion which the amount of land
in grass bears to that under corn and
green crops, an increase without doubt
attributable to the increased facility
with which cereals can be obtained from
foreign countries, making it more profit-
able for British farmers to devote them-
selves to the rearing of live stock. Of
the whole area of Great Britain, less than
60 per cent. is under the plow or in
pasture; but in England the proportion
is about 75 per cent. and in Wales above
80 per cent. while in Scotland it is under
25 per cent. (so much of Scotland being
barren). In Ireland the proportion is
about 75 per cent. The agriculture of
Ireland, though the soil itself offers every
advantage to the farmer, is in a very
different condition from that of Great
Britain, being in a very backward state
on the whole, this mainly due to the sub-
division of holdings and to overcrop-
ping, combined with the ignorance and
unskillfulness of the people. The British
government is beginning to remedy these
defects and Ireland promises again to
prosper.

Minerals.—Such is the mineral wealth
of the British Isles that there is scarcely
a metal or mineral product of economical
value which is not worked, to a greater
or less extent, beneath their surface.
Among these the first place is due to
coal, which, in regard both to the quan-
tity raised annually and its aggregate
value, surpasses any other mineral prod-
uct. The coal-fields are not confined to
one particular district, but extend as a
series of basins in an irregular curve
from central Scotland through northern
and middle England to the Bristol Chan-
nel. On the east side of Scotland there
are coal-fields both north and south of

the Forth; farther west lie the coal
basins of Lanark, Renfrew, and Ayr-
shire; the first famous throughout the
world for the immense manufacturing
establishments which it mainly has
called into existence and made prosper-
ous. In the north of England is the
great coal-field centering near Newcastle,
which gives it its name. The proximity
of this field to the sea, and the excellence
of the coal, unrivaled for domestic use,
early made it a great theater of mining
operations. Wales is also rich in coal,
but Ireland has very little. The total
area of coal lands is estimated at about
9000 sq. miles; the annual yield is about
260,000,000 metric tons (2205 lbs.).
The iron ores smelted in Great Britain
are principally carbonates. The most
important iron-stone districts are those
of Yorkshire, especially the rich Cleve-
land district in the North Riding, Lan-
cashire, Cumberland, Staffordshire, Lin-
colnshire, Northamptonshire, and the
coal-measures of Scotland. Blast fur-
naces are most numerous in Yorkshire,
Staffordshire, Cumberland, Durham, Lan-
cashire, S. Wales, and Lanarkshire. The
quantity of pig-iron produced is about
10,000,000 tons; steel (Bessemer and
open-hearth) 6,000,000 tons. Tin, lead,
and zinc are the metals next in impor-
tance to iron. Another important article
is salt, chiefly from rock salt and brine
pits. Granite, freestone, and roofing-
slate quarries are numerous, except in
the southeastern part of England.

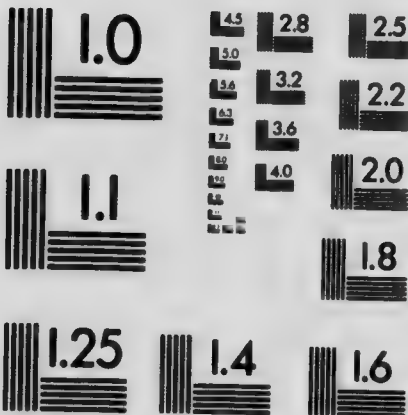
Fisheries.—The principal British fish-
eries are those of salmon, herring, had-
dock, ling and cod, turbot, soles, and
other flat fish. The first is carried on
chiefly in the rivers and estuaries of
Scotland and Ireland; the second chiefly
on the coasts and islands of Scotland,
large quantities of herrings being cured
and exported. Cod, haddock, etc., are
caught in great multitudes in the North
Sea, particularly on the Dogger Bank.
Among minor fisheries may be mentioned
those of mackerel, pilchards, oysters,
and lobsters. The facilities for convey-
ance now offered by railways has given
a great impulse to the trade in fresh fish,
and the London market alone draws to
itself a large share of the fishing results
all round the coasts. The value of the
fish caught annually is over \$50,000,000.

Manufactures.—These, in the order
of their importance, begin with cotton.
In this branch of industry Great Britain
still remains far ahead of other countries.
The Liverpool and Manchester district
and S. Lancashire as a whole are the
chief seats of the manufacture. The num-
ber of spindles in operation in 1910 was



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about 54,000,000, as compared with 28,000,000 in the United States. The peculiar excellence of the wool furnished by the English flocks made *woolens* the most ancient and for centuries the staple manufacture of England. Now this manufacture is next in importance to that of cotton, and draws largely for its supplies on other countries, particularly on the Australian colonies. The chief seats of the woollen manufacture are in England—the West Riding of Yorkshire, Lancashire, Gloucestershire, and Wiltshire being the most distinguished for broadcloths; Norfolk for worsted stuffs, Leicestershire and Nottinghamshire for woollen hosiery. Blankets and flannels have numerous localities, but for the finer qualities the west of England and several of the Welsh countries are most conspicuous. Carpets of every quality and pattern are extensively made at Kidderminster, Halifax, Leeds, etc. The woollen manufacture of Ireland is on a very limited scale, being confined to a few broadcloth factories, and a few blankets and flannels. Scotland has made much more progress, but still bears no proportion to England. The chief seats of the Scotch woolens are Kilmarnock for carpets, bonnets, and shawls; Stirling and its neighborhood for carpets and tartans; Ayrshire for blankets, etc., Galashiels, Selkirk, and other places in the basin of the Tweed for the cloth known as 'tweeds,' the manufacture of which originated here, though it has since extended to several parts of England. The linen manufacture is also important. In England the chief seat of the manufacture is Leeds and its vicinity, and other parts of the West Riding; also parts of Lancashire and Durham. Linen is the only staple of Ireland, where it is carried on chiefly in the province of Ulster, Belfast being the great center of the industry. In Scotland the manufacture is important. Besides plain linen, it includes osenaburgs, sheetings, sailcloth, sacking, etc.—chief seat, Dundee (with other Forfarshire towns); and diaper and damask—chief seat, Dunfermline. The staples of both towns are by far the most important of their kind in the kingdom. Large quantities of jute are also used in this manufacture, especially at Dundee. Silk manufacture is small. Besides the manufactures already mentioned, there are a great number which, though separately of less importance, absorb immense sums of capital, exhibit many of the most wonderful specimens of human ingenuity, and give subsistence to millions of the population. Among the most important of these are the several branches of the hardware industry, the manufacture of

steam engines and all kinds of machinery, of arms and ammunition, of plate, jewelry, and watches, of chemicals, dyes, manures, etc., of furniture, of glass, earthenware and porcelain, etc. Of vast extent also is the paper manufacture, in connection with which are various industries, of which it may be considered directly or indirectly, the parent—typography, founding, printing, books, engraving, etc. Another very important industry is that of shipbuilding, which has its chief seat on the Clyde and Tyne.

Commerce.—Of the extent of the commerce carried on by railway, river, canal, and highway there are little or no means of forming an estimate; but the foreign trade of the country can be stated. Britain carries on commerce with almost all countries. The trade with her colonies and dependencies is very large, but not more than one-third as much as with foreign countries. The foreign trade, as well as the inland trade is greatly promoted by the highly developed system of communication which now exists. The annual imports amount to about £600,000,000 (\$3,000,000,000), and exports to about £450,000,000 (\$2,250,000,000). The development of British shipping, when compared with that of other nations, is even more remarkable than that of its foreign commerce. Not only is the great bulk of the trade between Britain and other foreign countries carried on in British ships, so also is a large part of the trade between one foreign country and another. Hence we find that the magnitude of the mercantile marine of the United Kingdom is far greater than that of any other country, its sea-going tonnage reaching a total of over 18,000,000 tons.

Religion.—Every form of religion enjoys the most complete toleration, there are two churches, one in England having an Episcopal form of government and one in Scotland with a Presbyterian organization, established by law and partly supported by state endowment. Both of these are Protestant, and both in England and Scotland the great majority of those who do not belong to the established church are also Protestants. In England, however, these all belong to churches having a different organization from that of the Anglican Church, in Scotland most of them belong to churches virtually identical with the established church both in creed and organization. In Ireland there has been no state church since 1871, when a bill of the Anglican Church there established was disestablished. The great majority of the people are Roman Catholics.

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was long entirely voluntary. The first comprehensive measure for the promotion of elementary education by the state was passed in 1870. Its chief provisions were for the election of school-boards in districts in which there was a deficiency of school accommodation, with power to build and maintain schools out of rates levied for the purpose, and for the giving of aid by parliamentary grant to these board-schools as well as to previously existing schools. Discretionary power was originally given to the school-boards to enforce the attendance of children in their districts, but by subsequent enactments compulsory attendance of children at school from 5 to 14 years of age has been made the law for the whole of England and Wales, a school-attendance committee being established to look after this matter wherever there was no school-board. Recent acts of Parliament (1899-1904) have materially changed conditions. The parish and other attendance committees have been changed into school-boards, which may be denominational, all under a general Board of Education. This legislation applies only to England and Wales. The most numerous Board schools are those of the Church of England. The Scotch Education Act, passed in 1872, was from the first more comprehensive than the English one, requiring the election of school-boards in every burgh and parish, and making school-attendance compulsory throughout the country. The school age is from 5 to 13. Ireland is still far behind in the matter of education. Elementary education there is under the superintendence of the commissioners of national education, a body incorporated in 1845, with power, among other things, to erect and maintain schools wherever they think proper. In England there are a number of endowed grammar schools, and also the great public schools of Eton, Harrow, Winchester, Rugby, Charterhouse, Westminster, etc. In Scotland and Ireland also there are a number of secondary schools; but they form no part of an organized system.

For the higher education there are in England the universities of Oxford, Cambridge, London, Durham, and the Victoria University, Manchester; and in addition to these are colleges, some of them called 'university colleges,' at Leeds, Newcastle, Nottingham, Bristol, Birmingham, and other places, besides other institutions giving a university education in one or more departments; the training institutions for teachers; and the colleges belonging to the different dissenting bodies. London University is properly only an examining

board, but in connection with it there are, in London, University College and King's College. In Scotland there are the four universities of Edinburgh, Glasgow, Aberdeen, and St. Andrews, a university college at Dundee, and the normal or training schools of the different religious bodies. Ireland has the University of Dublin, the Queen's Colleges of Belfast, Cork, and Galway, in connection with the Royal University of Ireland, which is merely an examining and degree-conferring body; the Roman Catholic university, and Maynooth and other Roman Catholic colleges. As was to be expected, the expenditure in connection with popular education has greatly increased since the passing of the education acts. The annual parliamentary grants, which in 1840 amounted to \$150,000, had risen in 1870 to \$4,573,600, and later to \$30,000,000.

People.—The earliest inhabitants of the United Kingdom known to history were Celts, who inhabited both Great Britain and Ireland at the time of the Roman occupation. In the 5th and 6th centuries, however, the Celts were displaced through the greater part of South Britain and in the eastern lowlands of North Britain by the Anglo-Saxons, a Teutonic race from which the modern English and Lowland Scotch are mainly descended. The Celts as a distinct people were gradually confined to the mountainous districts of Wales and Cornwall and the Highlands of Scotland, and only in Wales and Scotland has the Celtic language survived in Great Britain, being still also spoken by many in the west of Ireland. There is a considerable Celtic element, however, among the population everywhere. The English language is the direct descendant of that spoken by the Anglo-Saxons, but contains a strong infusion of French elements introduced by the Normans in the 11th and following centuries, as well as other elements, chiefly of Latin and Greek origin, introduced in later times.

The population of the United Kingdom is very unequally distributed in the three countries of which the kingdom is composed. England and Wales had, in 1891, a population equal to 498 to the square mile, which is a denser population than any country in Europe except Belgium and Saxony; that of Ireland at the same date was 144 to the square mile, and that of Scotland only 132. The increase that has taken place in the population of Great Britain during the last century is very remarkable. At the first census, which took place in 1801 (and which did not include Ireland), the whole population of Great Britain was found to be a

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little under 11,000,000; at the census of 1901 it was 36,999,946. The growth in the population of the whole kingdom between 1831, the date of the first reliable Irish census, and 1911 was from 24,400,000 to 45,216,665. Of these, England had 34,043,076; Scotland, 4,759,445; Wales, 2,032,193; and Ireland, 4,381,951, the remainder being divided among the smaller islands and the soldiers and sailors abroad. This growth, however, was confined to Great Britain, for in Ireland the population has greatly declined (in 1841 it was fully 8,000,000). In 1911 the population of England and Wales was 36,075,269.

Extent of Empire.—The area of the British empire, as the total territory under British rule is usually termed, including recent acquisitions in Africa, is estimated at 11,467,294 square miles, with a population of about 396,294,752. In 1901 it was distributed as follows—The British Isles and European possessions (Gibraltar, Malta and Gozo); area, 121,391 square miles; population, 42,041,305; British India and feudatory states, Ceylon, Straits Settlements, Hong Kong, etc., in Asia; area, 1,827,234; population 291,014,006; Cape Colony, Natal, Sierra Leone, Mauritius, St. Helena, and other possessions in Africa, or islands adjacent, 359,073 square miles; pop. about 4,961,500; Canada, Newfoundland, Jamaica, Trinidad, and other West India islands; Honduras, Guiana, and all possessions in America, north or south, 3,614,224 square miles; pop. 6,721,251; Australia, Tasmania, New Zealand, Fiji, New Guinea, etc.; area, 3,259,199 sq. miles; pop. 4,285,297. The increase of British colonies, especially of Canada and Australia, in population, wealth, and trade, has been something prodigious within the last few years. Self-government has been conceded to the larger colonies.

Constitution.—Under the name of a constitutional and hereditary monarchy the government of Britain is vested in a sovereign and the two houses of parliament—the House of Lords and the House of Commons. Laws passed by these houses, and assented to by the sovereign, become the laws of the land. But under this general fixity of form the center of real power may change greatly, as it has in Great Britain within the last two centuries. The sovereign's right of veto on acts of parliament has practically passed into desuetude, while of the two legislative houses the House of Commons, from its being the expression of the national will as a whole, has become

the real center of power and influence. Popular rights and liberties are thus secured by the fact that the most influential part of the legislature is composed of members dependent on the confidence and trust of popular constituencies. Thus though the powers of the parliament may be regarded as unlimited, yet must always in the end give way before a decided and clear expression of public opinion. It is often said, therefore, that the constitution of Great Britain is a great part an unwritten law, and this unwritten law is continually receiving additions and adapting itself to the new forces and needs of the time. The natural flexibility of the British constitution is one of its greatest merits, and what most distinguishes it from the more rigid systems of other countries. One of the best examples of this quiet growth of unwritten law is the position occupied by such a body as the cabinet, a body never officially recognized by any act of parliament, and wholly unknown to the written law, yet practically the highest executive body in the kingdom, the nominally the executive government is vested in the sovereign. On this subject the late Mr. Bagehot remarks: 'The efficient secret of the English constitution may be described as the close union, nearly complete fusion, of the executive and legislative powers. According to traditional theory as it exists in all books, the goodness of our constitution consists in the entire separation of legislative and executive authorities. In truth its merit consists in their singular approximation. The connecting link is the cabinet. By that new word we mean a committee of the legislative body selected to be the executive body.'

The Sovereign.—The fundamental maxim upon which the right of succession to the throne depends is, that the crown is, by common law and constitutional custom, hereditary, and that the right of inheritance may from time to time be changed or limited by parliament under which limitations the crown continues hereditary. It descends to males in preference to the females, and adhering to the rule of primogeniture. The sovereign is of age at eighteen. The heir to the crown has, since the death of Edward III, inherited the title of Duke of Cornwall, and receives the title of Prince of Wales by letters patent. The power of the sovereign is limited by laws. The divine right, so obstinately maintained by the Stuarts, was recognized by the nation, and was abandoned by George III, Mary, and Anne ascending the throne, according to express declaration.

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only by virtue of a transmission of the crown to them by the nation. But the maxim has been acknowledged, particularly since the Restoration, that there is no power in the state superior to the royal prerogatives: the acts of the king are therefore subject to no examination, and the king is not personally responsible to any tribunal: hence the maxim: The king can do no wrong. Yet there is sufficient provision for confining the exercise of the royal power within the legal limits. 1. All royal acts are construed in accordance with the laws, and it is taken for granted that the king can never intend anything contrary to law. 2. The counselors of the king are responsible for the royal acts, and, as well as all those who are concerned in the execution of them, are liable to impeachment and examination, without the right of defending themselves by pleading the royal commands. 3. The parliament and the judicial tribunals have also the right to discuss freely such royal acts, and, in particular, parliament and each individual member of the upper house has the right to make remonstrances to the crown. 4. Individuals are protected from any abuses of the royal power by the Habeas Corpus Act, the liability of the agents to prosecution, the right of complaining to parliament, and the liberty of the press.

The king is the supreme head of the state in peace and was the lord paramount of the soil, the foundation of justice and honor, and the supreme head of the church. He has the prerogative of rejecting bills in parliament, which, however, has not been exercised since the year 1692. As the generalissimo, or the first in military command within the kingdom, he has the sole power of raising and regulating fleets and armies, which, however, is virtually controlled by the necessity he is under of obtaining supplies from parliament. As the fountain of justice, and general conservator of the peace of the kingdom, he alone has the right of erecting courts of judicature, and all jurisdictions of courts are derived from the crown. As the fountain of honor, of office, and of privilege, he has the power of conferring dignities, privileges, offices, etc. In the foreign relations of the nation he is considered the nation's representative, and makes treaties, declares war, etc. As advisers he has the privy-council and the cabinet (which see). Yet these privileges, as a rule, have long been in desuetude, and any act approaching oppression or an arbitrary exercise of power by a British sovereign, would be apt to lead to revolutionary resistance.

The Parliament.—The origin of the British Parliament has been sought rightly enough in the *witenagemots* or national assemblies of the Anglo-Saxons. In somewhat different form these were continued in the Norman times, and as early at least as the reign of Henry III we find not only the barons and the high ecclesiastics, but also the knights of the shire with the burgesses summoned to attend. These formed the *three estates*, now known as the lords spiritual, the lords temporal, and the commons. In the reign of Edward III (1327-77) the separation of the estates into two houses—the House of Lords, consisting of the lords spiritual and the lords temporal, and the House of Commons, consisting of the knights, citizens, and burgesses—became settled. All the peers were not originally entitled to a seat as a matter of right, but only those who were expressly summoned by the king. Every hereditary peerage now, however, confers the right of a seat in the House of Lords or Upper House. The number is indefinite, and may be increased at the pleasure of the crown, which, however, cannot deprive a peer of the dignity once bestowed. The upper house at present comprises about 560 members. By the act of union with Scotland, 16 representatives of the Scottish peerage are elected by the Scottish nobility for each parliament's duration (seven years), and 28 are elected for life by the peers of Ireland.

The parliament is not permanent, and it is the royal prerogative to summon and dissolve it. The first business of the Commons is to elect a speaker. The members then take the oath of allegiance, and when this is done the king's speech is read, being answered by an address from each house. In the upper house the lord-chancellor presides, holding the position of the speaker in the Commons. All grants of subsidies or parliamentary aids must originate with the House of Commons, and the Lords have not the right to amend, or even to accept or reject, a money bill. As the parliament is summoned, so it is prorogued by the royal authority. A dissolution of the parliament is effected either by the authority of the crown or by length of time. The House of Commons being chosen but for seven years, at the expiration of that time parliament is dissolved *ipso facto*. The lower house of parliament has the direction of all financial concerns; and there is no subject which may not be brought before it by petition, complaint, or motion of a member. The upper house is the supreme court of judicature in the nation. In civil cases it (now represented

by the Lords of Appeal in Ordinary) is the supreme court of appeal from the superior tribunals of the three kingdoms. In indictments for treason or felony, or misprision thereof, where the accused is a peer of the realm, the House of Lords are the judges of the law and the fact. In cases of impeachment by the House of Commons the House of Lords are also the judges. All the forms of a criminal trial are then observed, and the verdict must be by a majority of at least twelve votes.

The House of Commons previous to the Reform Bill of 1832 consisted of 658 members, of whom 513 were for England and Wales, 45 for Scotland, and 100 for Ireland. In this representation there were great injustices and anomalies. Many of the boroughs had quite fallen into decay, so that a place like the famous Old Sarum, which consisted only of the ruins of an old castle, sent two members to parliament, while great manufacturing towns like Manchester and Birmingham were absolutely without representation. Not only the *rotten boroughs*, as these decayed constituencies were called, but also in many cases the towns, where the right of suffrage belonged to a small number of freeholders, were practically in the hands of a single family, and in this way a few great houses—Norfolk, Bedford, Devonshire, and the Pelhams, etc.—commanded more than 100 seats in parliament. For the few places that were in the hands of independent voters a shameless system of bribery existed, in spite of the prohibitory laws, and the prices of votes were generally well known: a seat for a small place cost about \$25,000. The Reform Bill of 1832 brought great changes. Occupiers of lands or tenements in counties at a yearly rent of not less than \$250, and occupiers as owner or tenant of a house or shop in a borough of a yearly value of \$50, now received the franchise. Fifty-six rotten boroughs were wholly disfranchised; thirty boroughs were deprived of one member; and one borough (Melcombe-Regis cum Weymouth, which had four) of two members; twenty-two boroughs were created in England, to return two members each, and nineteen boroughs to return one member each. Besides taking away the right of election from many insignificant places, and vesting it in large, or at least in tolerably numerous, constituencies in new boroughs, the act introduced something like uniformity in the qualifications of the voters of the old boroughs and cities, and extended the elective franchise from close corporations, or privileged bodies, to the citizens at large.

After several unsuccessful attempts Lord John Russell, Lord Palmerston, and Mr. Gladstone to pass bills for further reform, in 1867 Mr. Disraeli, then chancellor of the exchequer, succeeded in carrying through a bill which conferred the borough franchise on all householders who had resided in the borough for two months previous to the last day of June in any year, and had been assessed and paid poor-rates, and on all lodgers who had occupied for a like period lodgings of the yearly value of \$50 unfinished. In countries the franchise was bestowed on occupiers as owners or tenants of subjects of \$60 ratable value, and the copyhold and leasehold franchise was reduced from \$50 to \$25. This related only to England and Wales, bills of a similar character were passed for Scotland and Ireland in the following year. In this way the electorate, which was 1,352,970 in 1867, rose to 2,243,000 in 1870. The total number of members still remained at 658. To Manchester, Liverpool, Birmingham, and Leeds were assigned three members each, and to London University one. Populous counties were further divided, and to many of the divisions two members each were given. The reform in the franchise and in representation, thus instituted, was added by acts passed at later dates, and in 1911 a bill was passed extending the vote in a limited degree to women who had reached the age of thirty years.

Army and Navy.—The British army is raised on the authority of the sovereign, who is looked on as its head, but the number of troops and the cost of the different branches are regulated annually by a vote of the House of Commons. In 1911 the peace strength of the army was 257,000, reserves 543,000; strength 800,000; unorganized force available for duty 1,200,000. No British citizen is obliged to bear arms except for the defense of his country; but all able-bodied men, from eighteen to thirty, are liable to militia service, the militia being raised, when required, by ballot. Enlistment among the regulars is either for twelve years' army service (service), or for seven years' army service and five years' reserve service (service). The head of the military administration is the secretary of state for war. See *Army*.

The administration of the navy is carried on by the Board of Admiralty, consisting of six members, and having at its head the First Lord, who has supreme authority. The estimates provide for a total of about 126,000 men and boys in the naval service, including officers

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marines. The most important and formidable portion of the navy is the armored fleet, which consists of about eighty vessels, including those not yet completed. See *Ironclad Vessels*.

Finance, Revenue and Expenditure.—The practice of borrowing money in order to defray a part of the war expenditure began in the reign of William III. At first it was customary to borrow upon the security of some tax, or portion of a tax, set apart as a fund for discharging the principal and the interest of the sum borrowed. This discharge was, however, very rarely effected, and at length the practice of borrowing for a fixed period was almost entirely abandoned, and most loans were made upon *interminable annuities*, or until such time as it might be convenient for government to pay off the principal. Originally the interest paid by the government on these loans was comparatively high and subject to considerable variation. But in the reign of George II a different practice was adopted. Instead of varying the interest upon the loan, the rate of interest was generally fixed at three or three and a half per cent. the necessary variation being made in the principal funded. Thus, if the government were anxious to borrow in a three-per-cent. stock, and could not negotiate a loan for less than four and a half per cent. they effected their object by giving the lender, in return for every £100 advanced, £150 three-per-cent. stock—that is, they bound the country to pay him or his assignees £4, 10s. a year in all time to come, or, otherwise, to extinguish the debt by a payment of £150. In consequence of this practice the principal of the debt now amounts to far more than the sum actually advanced. At the death of William III, the public debt, partly by reason of the long wars, amounted to £16,394,702, the public income being £3,895,205. By far the greater part of the next reign also was a time of war, and on the death of Queen Anne the national debt amounted to £54,145,363. The reign of George I, was undisturbed by war, which enabled the government of the time to reduce the debt by £2,053,125, so that at the accession of George II, the whole amount of the debt was £52,092,238. At the conclusion of the Peace of Paris after the Seven Years' war it was £138,865,430, and at the end of the American war, £239,350,148. During the French war £601,500,334 of new debt was contracted, and on the 1st of February, 1817, when the English and Irish exchequers were consolidated, the total debt was £840,850,491. Since then

the debt has been greatly reduced, and in 1910 reached a total of approximately £750,000,000.

History.—The island in the remotest times bore the name of *Albion*. From a very early period it was visited by Phœnicians, Carthaginians, and Greeks, for the purpose of obtaining tin. Caesar's two expeditions, 55 and 54 B.C., made it known to the Romans, by whom it was generally called *Britannia*; but it was not till the time of Claudius, nearly a hundred years after, that the Romans made a serious attempt to convert Britain into a Roman province. Some forty years later, under Agricola, the ablest of the Roman generals in Britain, they had extended the limits of the *Provincia Romana* as far as the line of the Forth and the Clyde. Here the Roman armies came into contact with the Caledonians of the interior, described by Tacitus as large-limbed, red-haired men. After defeating the Caledonians under Galgacus at 'Mons Grampius' Agricola marched victoriously northwards as far as the Moray Firth, establishing stations and camps, remains of which are still to be seen. But the Romans were unable to retain their conquests in the northern part of the island, and were finally forced to abandon their northern wall and foris between the Clyde and the Forth and retire behind their second wall, built in 120 A.D. by Hadrian, between the Solway and the Tyne. Thus the southern part of the island alone remained Roman, and became specially known as *Britannia*, while the northern portion was distinctively called *Caledonia*. The capital of Roman Britain was York (*Eboracum*). Under the rule of the Romans many flourishing towns arose. Great roads were made traversing the whole country and helping very much to develop its industries. Christianity was also introduced, and took the place of the Druidism of the native British. Under the tuition of the Romans the useful arts and even many of the refinements of life found their way into the southern part of the island. Thus from the time of the Roman conquest, and still more decidedly after the Saxon invasions in the fifth century, the history of Britain branches off into a history of the southern part of the island, afterwards known as England, and a history of the northern part of the island, afterwards named Scotland. It was not till the union of the crowns in 1603 that the destinies of England and Scotland began again to unite; and it was not till the final union of the parliaments in 1707 that the histories of the two countries may be said to merge into one.

From this latter period accordingly we shall give an outline of the history of the United Kingdom. See also the articles *England, Scotland, and Ireland.*

The measure which declared the parliaments of England and Scotland united, and the two countries one kingdom, known as the United Kingdom of Great Britain, was passed, after violent opposition, in the reign of Queen Anne, 1st of May, 1707. This union, however much it was opposed by the prejudices and interests of particular men or classes at the time, has contributed very much to the prosperity of both countries. The Grand Alliance, which it had been the aim of William's later years to form between Holland, Austria, and England against the threatening growth of French power, now held the field against the armies of France, and the victories of Marlborough at Blenheim and Ramillies, and the taking of Gibraltar and Barcelona, ended in the Treaty of Utrecht in 1713, by which the British right of sovereignty over Hudson Bay, Newfoundland, Nova Scotia, Minorca and Gibraltar was acknowledged, and the foundation of Britain's imperial and colonial power securely laid. The remainder of Anne's reign was distracted by the never-ending altercations of domestic parties. She died on the 1st of August, 1714; and with her ended the line of the Stuarts, who had held the scepter of England 112 and that of Scotland 343 years.

At her death George I, elector of Hanover, maternally descended from Elizabeth, daughter of James I, according to the Act of Settlement ascended the throne of Britain. The Whigs under this prince regained that superiority in the national councils of which they had long been deprived, and this, along with the suspension of the Habeas Corpus Act and some other extreme precautionary measures, increased the irritation of the Tory and Stuart party. In 1715 the Earl of Mar in Scotland and the Earl of Derwentwater in England raised the standard of rebellion and proclaimed the Chevalier St. George (the Old Pretender) king. But the insurrection, feebly supported by the people, was soon suppressed. In 1716 the Septennial Act was passed, making parliament of seven instead of three years' duration. In 1720 occurred the extraordinary growth and collapse of the South Sea Company. From this date till 1742 the government was virtually in the hands of Sir Robert Walpole, the first, we might say, of modern premiers, governing the cabinet and chiefly responsible for its doings. Walpole had great

sagacity, prudence, and business ability, and could manage dexterously the parliament, and the people. It is true that in the case of the parliament he achieved this by undue influence in elections and a scandalous use of bribery. But the power he thus acquired was generally wisely used. The failure of the war with Spain into which he reluctantly entered drove him from office, and in 1742 his long ministry came to an end. In 1743 George II, frightened at the dangers to Hanover, drew Britain into the wars between France, Prussia, and Austria, regarding the cession of the Emperor Charles. George himself fought at the head of his troops at Dettingen (1743), where he obtained a complete victory over the French, which was balanced, however, later by the defeat at Fontenoy (1745).

A fresh attempt was now made to restore the Stuart family to the throne of Britain. Charles Edward, son of the Old Pretender, having been furnished by France with a small supply of money and arms, landed on the coast of Lochalsh in the Western Highlands, in 1745, and was joined by a considerable number of the people. Marching southwards with 1500 Highlanders, his forces increased as he advanced, he entered Edinburgh without opposition; and having defeated Sir John Cope near Prestonpans, he marched into England. He now took Carlisle, and advanced through Lancaster, Preston, and Manchester, Derby, within 100 miles of London; finding himself disappointed of expected succors from France, and the English Tories, contrary to his expectations, taking aloof, he commenced his retreat into Scotland, closely pursued by the king's troops, whom he again defeated at Falkirk. With this victory his good fortune terminated. The Duke of Cumberland, having arrived from the continent, put himself at the head of forces which were destined to check the rebels; and the armies having met at Culloden, near Inverness, Charles was completely defeated. After lurking six months amid the wilds of Inverness-shire, he at length, with much difficulty, escaped to France.

The war of the Austrian succession, which still continued and which was the cause of hostilities between the French and British in India as well as elsewhere, was terminated by the treaty of Aix-la-Chapelle in 1748. During most of this period Pelham and his brother, the Duke of Newcastle, had been the ruling ministers, and in their hands the art of government had reached a low level.

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as regards morality and ability. In 1752 the *new style* of reckoning time was introduced and the *old style* being eleven days behind, the 3d of September, 1752, was called the 14th. At the same time the 1st of January was fixed as the opening day of the year instead of the 25th of March.

Soon after, the French, uneasy at the growing colonial power of Britain, made a determined effort against the British colonies and possessions in North America and the East Indies, and at first the British met with several disasters in America. In 1756 the Seven Years' war broke out, Austria and France being allied on the one side, and Prussia and England on the other, and ill success attended the British arms in Europe also. Fortunately, a great war minister, William Pitt, now took the helm of state. In 1758 the British made themselves masters of several French settlements in North America, while the attack made by Wolfe on Quebec in 1759 was completely successful, and gave Britain the whole of Canada. The same year the British and their allies defeated the French at Minden in Prussia. In the East Indies the French were even less successful than in America. Clive's victory at Plassey (1757) and Coote's at Wandewash (1760) secured the British empire in the East, and together with the naval feats of Hawke and Boscawen made England the greatest of maritime and colonial powers.

On the accession of George III in 1760 hostilities were still carried on, generally to the advantage of the French as far as the theater of war in Germany was concerned, but still more to their loss in the other quarters of the world where they were engaged with the British in a struggle for supremacy, and this notwithstanding that Spain had now joined her forces to those of France. At length the success of the British arms induced France and Spain to accede to terms, and the war ended by the Treaty of Paris in 1763. The French relinquished nearly all their possessions in North America; Minorca was restored to Britain; in the East Indies they got back their factories and settlements, on condition that they should maintain neither forts nor troops in Bengal; Cuba and Manila were resigned to the Spaniards. In Europe everything was restored to the *status quo*.

The expenses of this war, which had been undertaken partly for the defense of the American colonies, had added upwards of £72,000,000 to the national debt. It seemed to the British people to be

just that the Americans should be taxed to assist in payment of the interest. The Americans did not deny the justice, but replied that if they were to be taxed they had a right to be represented in parliament, in order that, like other British subjects, they might be taxed only in consequence of their own consent. Grenville, then the prime-minister, stood to his purpose, however, and introduced a bill for imposing certain stamp duties on the American colonies. The Americans protested and resisted, and partly by the influence of the great Pitt, who had steadily opposed the measure, the bill was withdrawn. On the illness of Pitt, now Lord Chatham, in 1787, Townshend became premier, and again revived the project of taxing the Americans by imposing duties on tea; and in 1770 Lord North, as his successor, set himself to carry it out. The result was that in 1775 America had to be declared in a state of rebellion, and a war began, in which both France and Spain joined the revolted colonies, and of which the result was the recognition of the independence of the United States. On the American side of this struggle the great name is that of George Washington. On the British side the war was unskillfully conducted, and though they gained some successes these were more than counter-balanced by such blows as the capitulation of Burgoyne with nearly 6000 men at Saratoga (1777), and of Cornwallis at Yorktown with 7000 (1781). Against their European foes the British could show such successes as that of Admiral Rodney off Cape St. Vincent (1780); the brilliant defense of Gibraltar by General Elliott (1779-82); and Admiral Rodney's victory over the French fleet in the West Indies (1782). The war closed with the Peace of Versailles in 1783. Britain finally acquired several West Indian islands; Spain got Florida and Minorca, France Pondicherry and Chandernagore in India. The struggle had added over £100,000,000 to the British national debt.

From 1783 to 1801 the government of Britain was directed by William Pitt, the younger son of Lord Chatham, who when only twenty-four years of age was placed as first lord of the treasury and chancellor of the exchequer. The affairs of Ireland and India, and the impeachment of Warren Hastings, were among the first subjects which occupied the attention of Pitt's ministry. In 1782 the Irish had been able to extort from Britain, then engaged in her struggle with the American colonies, the right to establish an independent parliament; so

that from this year there were two independent governments in the British Isles till 1800, when Pitt, who had in the interval had some experience of the difficulties arising out of two co-ordinate legislatures, contrived once more to unite them.

In 1789 the French Revolution began. For a time there was considerable sympathy in England with this movement; but as the revolutionaries proceeded to extreme measures there was a reaction in English feeling, of which Edmund Burke became the great exponent, and the execution of Louis XVI gave rise to diplomatic measures, which finally terminated in a declaration of war against Britain by the National Convention, February 1, 1793. At first Britain co-operated with Prussia, Austria, etc., against France, and successes were gained both by sea and land; but later on the continent the armies of the French Republic were everywhere triumphant, and in 1797 Britain stood alone in the conflict, and indeed soon found a European coalition formed against her. The war was now largely maritime, and the naval successes of Jervis off St. Vincent and Duncan off Camperdown were followed, when Bonaparte led an expedition to Egypt, having India as its ultimate object, by the victories of Nelson in Aboukir Bay, and Abercromby at Alexandria. In 1798 a rebellion in Ireland had to be crushed. Peace was made in 1802 by the Treaty of Amiens, only to be broken by another declaration of war in 1803, as the ambitious projects of Napoleon became evident. In spite of the efforts of Pitt (who died in 1806) in the way of forming and supporting with funds a new coalition against France, the military genius of Napoleon swept away all opposition on land, though the naval victory of Trafalgar (1805) established England's supremacy on the seas. Napoleon, who had assumed the title of Emperor of the French in 1805, and was now virtually the ruler of Europe, put forth his Berlin decrees (1807), prohibiting all commerce with Britain wherever his power reached, set his brother Joseph on the throne of Spain, and occupied Portugal. But the spirit of resistance had now taken deep root in the British people, and in 1808 troops were sent into Spain under Sir John Moore, and a year later Wellington, then General Wellesley, landed in Portugal. Then began that famous series of successful operations (the Peninsular War) which drove back the French into their own country, and powerfully contributed to undermine the immense fabric of Napo-

leon's conquests. The failure of the French invasion of Russia led to Napoleon being occupied in 1814, Napoleon deposed and exiled to Elba, and Louis XVIII placed on the throne of France. Escaping in 1815, Napoleon appeared more in the field with a large army, but Wellington and Blücher hastened to oppose him, and at Waterloo Napoleon's long career of conquest ended in a crushing defeat. The restoration of Louis XVIII followed, and Napoleon was sent to the prison of St. Helena. Of her conquests Britain retained Tobago, St. Lucia, Mauritius, the Cape of Good Hope, Demerara, Essequibo, Berbice, Holland, and Malta; Ceylon and Trinidad had been gained in 1802. Therefore Britain emerged from this long struggle with a very great increase of territorial possessions and political importance.

After the termination of the war with Napoleon many things concurred to make a troublous era in the home administration. The new burden of debt which the wars had left on the nation, the harvests of 1816 and 1817, a succession of governments which had no idea of absolute resistance to all reform etc.; all these contributed to increase discontent. The result was a state of Radical agitation, accompanied often by serious riots throughout the country, especially in the large towns, and demands for reform in parliament and the system of representation. The death of George III and accession of George IV, in 1820, made little change in respect. From 1822 a succession of statesmen, Canning, Peel, and Lord Grey gave the government a more liberal tone and did much to satisfy the popular demands. The Catholics were admitted to parliament; the severity of the restrictions on commerce was relaxed and in the face of a determined opposition Earl Grey carried the Reform Bill of 1832 (two years after the accession of William IV), which gave large manufacturing towns a voting power in proportion to their importance, practically transferred the center of political power from the aristocracy to the middle classes. The next great popular measure was the abolition of negro slavery in every British possession in 1834.

William IV died June 20, 1837, and was succeeded by Victoria. The following is notable as that in which the Chartists began their movement for reform, which continued more or less active, with popular assemblies, presentations of monster petitions, and occasional tumults, till 1848, when it was with-

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much trouble suppressed. The same years saw the struggle of the Anti-Corn Law League, of which Cobden and Bright were the chiefs, and which was finally successful; Sir Robert Peel, the leader of the Tory party, himself proposing the repeal of the corn duties (1846). The principle of free trade had further victories in the repeal of the navigation laws, and in the large abolition of duties made during Lord Aberdeen's ministry (1853).

In 1852-53 dissension arose between Russia and Turkey regarding the rights of the Latin and Greek churches to preferable access to the 'holy places' in Palestine. The Emperor of Russia, resenting concessions made to French devotees, sent Prince Menschikoff to Constantinople to demand redress, and not being satisfied, war was declared, June 26, 1853. On the plea that it was impossible to leave Russia a free hand in dealing with Turkey, France and Britain formed an alliance against Russia, March 28, 1854. The invasion of the Crimea followed; several important battles (Alma, Balaklava, Inkerman) took place, resulting in favor of the allies, till at length Sebastopol fell (1855), and peace was signed the following year at Paris. Russia ceded a part of Bessarabia to Turkey, and consented to the free navigation of the Danube and the neutrality of the Black Sea. (See *Crimean War*.)

Scarcely was the Crimean war over when Britain was threatened with the loss of her possessions in India through the mutiny of the Sepoys. For a time the authority of government was entirely suspended throughout the greater part of Bengal, the whole of Oude, and a large portion of Central India; but in a comparatively short time 70,000 British troops, pouring in from Burmah, Mauritius, the Cape, and elsewhere, entirely suppressed the rebellion. (See *Indian Mutiny*.) One result of the mutiny was that, by a bill passed Aug. 2, 1858, the sovereignty hitherto exercised over the British possessions in India by the East India Company was transferred to the British crown.

Two wars with China (1858 and 1860), during which Canton was bombarded and Peking taken by united forces of Britain and France, opened up five new Chinese ports to trade, with other advantages. The great Civil war in America from 1861 to 1865 had for a time a disastrous effect on the cotton-trade in Lancashire, causing widespread distress. (See *Cotton Famine*.) Between 1861 and 1867 the Fenian move- ment, which had for its object the sep-

aration of Ireland from the United Kingdom, occasioned some excitement. See *Fenians*.

Parliamentary reform was attempted by several governments without success, until the government of the Earl of Derby in 1867 passed a measure establishing the principle of household suffrage. This year also saw the passing of the act by which the Dominion of Canada was constituted. In 1867 the Abyssinian expedition set out, and effected its object—the relief of English captives—in the spring of 1868. In the same year Lord Derby was succeeded by Mr. Disraeli as leader of the Conservative party, then in office. Before the end of the year a general election put the Liberals in power. In 1869 Mr. Gladstone's administration passed a bill for the disestablishment of the Irish Church. In 1870 an Irish Land Law Bill, having for its object the regulation of the relations between landlord and tenant, became law; and during the same session the act of parliament establishing a national system of education for England was passed. In 1871 the purchase of commissions in the army was abolished. Next followed the Ballot Act and the Scotch Education Act. Early in 1874 Mr. Gladstone dissolved parliament, and a large Conservative majority being returned, Mr. Disraeli (afterwards Earl of Beaconsfield) again became premier. The Ashantee war, begun the previous year, was brought to a successful termination early in 1874. In 1876 the title of Empress of India was added to the titles of the queen. During the Russo-Turkish war of 1877-78 Britain remained neutral, but took an important part in the settlement effected by the Berlin Congress, and acquired from Turkey the right to occupy and administer Cyprus. Then followed a war in Afghanistan, a war with the Kaffirs of Zululand, and a brief war with the Boers of the Transvaal.

A new parliament was returned in 1880 with a large Liberal majority, and Mr. Gladstone once more became premier. This parliament passed a land-act for Ireland (1881), an act for putting down crime in Ireland (1882), a reform act equalizing the borough and county franchise (1884), and a redistribution of seats act (1885), both already described. The intervention of Britain in Egyptian affairs led to the bombardment of Alexandria by the British fleet (July, 1882), and the sending of an army into Egypt to quell the rebellion headed by Arabi Pasha, which was soon accomplished; while the rising under the Mahdi in the

Sudan caused British troops to be despatched to Suakin, and another force to be sent by way of the Nile (in the autumn of 1884) to relieve General Gordon at Khartoum, an object which it was too late to accomplish. Since that date Britain has been the controlling power in Egypt and has recovered for it the lost Sudan territory, and in the years that followed the British holdings of African territory were largely increased, Britain gaining the most in the partition of Africa among the European powers. Oct. 11, 1899, war was declared by the Boers of the Transvaal and Orange Free State, the aim being the destruction of the British paramountcy in South Africa. This led to the annexation of those states by the British in 1900, after a fierce contest, in which the British met with numerous disastrous reverses at first. In 1900 a new parliament was elected, which again supported the Conservative ministry, with a slightly increased majority. Queen Victoria died January 22, 1901, and was succeeded by her son, Edward VII.

The reign of the new monarch was one of peaceful conditions, yet of frequent threats of war and of continued preparation for possible hostilities, especially with Germany, which had become a great commercial rival of Britain. This led to a great increase in the British navy, and to the building of a class of warships known as Dreadnoughts, larger and more powerful than any then in existence. But no advantage was gained by this, for the other nations responded by building still larger vessels. To secure her colonial interests in the East Britain made a treaty of alliance with Japan for mutual aid and assistance in certain exigencies. Changes in political condition took place in the great British colonies. Canada had long been combined into a practically independent commonwealth and the Australian colonies took similar action in 1900, forming an Australian federation. In 1910 the South African colonies took similar action, forming a South African Union composed of Cape Colony, Transvaal, Orange River Colony and Natal. In India, meanwhile, great unrest was displayed by the natives, who showed a strong revolutionary spirit and in Egypt a spirit of revolt against British domination was manifested. Nearer home the question of Irish unrest was prominent, the desire for home rule being vigorously displayed, while the misery of the Irish peasantry called for some radical steps of alleviation. This was in large measure accomplished in a law passed by

parliament in 1903, intended to bring about the abolition of the evils of landlordism. Parliament undertook to assist tenants to pay for their farms and also to loan them a large sum of money at low interest and on long terms of repayment. These measures proved highly beneficial and promised to bring to an end the long misery of the Irish farming population. In England questions of political economy became prominent. The Conservative ministry, which had long been in power under Lord Salisbury and his successor, Balfour, came to an end in 1905 when a Liberal ministry succeeded under Campbell-Bannerman, who was succeeded in 1908 by Herbert Henry Asquith, with David Lloyd-George as Chancellor of the Exchequer. The latter played a prominent part by bringing in a financial measure for the adequate taxation of the estates of the great landholders, which had long paid mere nominal taxes. A system of old age insurance was also adopted and went into effect on January 1, 1909, under which small pensions were to be paid to men over seventy years of age. The attempt to pass the radical budget was bitterly resisted in the House of Lords, and on passed after a new parliament had been elected in which the Liberals were supported. Edward VII died on May 1910. He was succeeded by his oldest surviving son under the title of George V, his coronation taking place in June 1911. The events of his early reign were a movement which ended in depriving the House of Lords of its power of vetoing acts of the Lower House, and measure widely increasing the principle of national insurance. Later measures of importance were the disestablishment of the Church of England in Wales and an act providing Home Rule for Ireland. Upon the declaration of hostilities in Europe, in July, 1914, Britain announced that in accordance with the terms of her agreement with France she would not permit Germany to attack France or violate the neutrality of Belgium, guaranteed by the Powers in 1832. War against Germany was accordingly declared. Britain was very differently situated from the other countries involved in the stupendous struggle, which began in August, 1914. While Germany, France, Russia, Austria and Italy had systems of conscription and large numbers of citizens who had been trained in military duties, Britain depended solely on a volunteer army, and its interests were so widespread over the earth that its small standing army was scattered among its many colonies, especially in India, there being comparatively few at home and in readiness for immediate

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ate action. But, on the other hand, she might fairly claim to hold the dominion of the sea, her great war fleet being equal in fighting power to that of any two of the other nations. Thus, while from a military point of view the British Empire was unfit to take immediate part in a great war, from a naval point of view it stood at the head of the nations, having a superiority in sea power that Germany found itself unable to cope with during the war, and which swept all German power except that of the submarines from the face of the open sea. This superiority of Great Britain was immediately taken advantage of, a powerful fleet of British dreadnoughts, cruisers, destroyers, and other types of warships being sent without a day's delay to hold the German navy close prisoner in its naval bases at Heligoland and Kiel Canal, and so well has the siege been maintained that only on one occasion have the German ships sought to break through, and that unsuccessfully. A few German cruisers in the open sea when the war began did a degree of damage to British shipping, but these were soon disposed of and the British war fleet remained masters of the ocean. This, however, was not the case with the great merchant fleet of the island kingdom. The submarine, Germany's one potent naval weapon, soon began to make its power felt, and as it grew in numbers and efficiency there was some reason to believe that the German project of starving England by sending its food-carrying merchant fleet to the bottom might eventually be realized. By the end of the third year of the war these sea wasps had done vast damage and the question of how best to defeat them remained an open one. Aside from the siege of the German naval bases and the patrol work kept up around the British islands, Britain made one vigorous naval assault, this being an effort to reach and take Constantinople by aid of a squadron of war vessels. This matter seems to have been very badly managed, no land force being sent to support the work of the fleet. The result was that three warships were sunk by the Turkish forts and the others repelled. Subsequently, a land force was sent to the peninsula of Gallipoli, but the Turks had been given time to strongly fortify this route and the enterprise proved a disastrous failure. As regards the work of the German submarines, the most notable success was the sinking, without warning, by a torpedo, on May 7, 1915, of the great British liner *Lusitania*, 1152 lives being lost, 114 of these being Americans. This was the first step in the series of attacks on American citizens on the high seas which eventually brought the United States into the war.

The government of Great Britain meanwhile had been actively engaged in raising a large volunteer army, in broad financial movements for the purpose of financing the enormously expensive struggle, and in strenuous activity in manufacturing the vast quantity of cannon and other munitions of war needed, and in supplying the people with food from abroad by aid of its great merchant fleet. The work of building up an army went on with discouraging slowness, and eventually conscription had to be resorted to. The result was that by the end of 1917 the island empire had 4,000,000 trained troops in the field, in addition to the large number killed, wounded and taken prisoners in the more than three years of desperate warfare. In gaining these, the colonies of the British Empire had loyally aided the mother country, Canada furnishing 500,000 men;

The British Empire, including the Colonies, had a casualty list of 3,049,992 men out of a total population of 440,000,000. Of these 658,665 were killed; 2,032,122 were wounded, and 359,204 were reported missing. It raised an army of 7,000,000, and fought seven separate foreign campaigns, in France, Italy, Dardanelles, Mesopotamia, Macedonia, East Africa and Egypt. It raised its navy personnel from 115,000 to 450,000 men. Co-operating with its allies on the sea, it destroyed approximately one hundred and fifty German and Austrian submarines.

It was a proud day for the British Empire when, following the armistice of November 11, 1918, the German High Seas Fleet, consisting of 71 vessels, was surrendered on November 21 and interned at Scapa Flow, Scotland. The fleet was scuttled by its German crews, June 21, 1919, shortly before the signing of the peace treaty. At the peace conference (q. v.) Lloyd George, Premier of Great Britain, was one of the commanding figures, and with A. J. Balfour, Bonar Law, and others, signed the treaty June 28, 1919. The aftermath of war brought a number of labor troubles, but these were adjusted. The Prince of Wales visited Canada and the U. S. in 1919.

Britannia (bri-tan'ni-a), the ancient name of Britain.

Britannia Metal, also called **WHITE METAL**, a metallic compound or alloy of tin, with a little copper and antimony, used chiefly for teapots, spoons, etc. The general proportions are 85½ tin, 10½ antimony, 3 zinc, and 1 copper.

Britannicus (bri-tan'i-kus), son of the Roman emperor Claudius, by Messalina, born A.D. 42, poi-

soned A.D. 56. He was passed over by his father for the son of his new wife Agrippina. This son became the emperor Nero, whose fears that he might be displaced by the natural successor of the late emperor caused him to murder Britannicus.

British Association, FOR THE ADVANCEMENT OF SCIENCE, a society first organized in 1831, mainly through the exertions of Sir David Brewster, whose object was to assist the progress of discovery, and to disseminate the latest results of scientific research, by bringing together men eminent in all the several departments of science. Its first meeting was held at York, on September 26, 1831, under the presidency of Lord Milton; and the principal towns of the United Kingdom have on different occasions formed the place of rendezvous, a different locality being chosen every year. The *séances* extend generally over about a week. The society is divided into sections, which, after the president's address, meet separately during the *séances* for the reading of papers and conference. Soirees, conversaziones, lectures, and other general meetings are usually held each evening during the meeting of the Association. As the funds which the society collects at each meeting are more than sufficient to cover its expenses, it is enabled to make money grants for particular scientific inquiries.

British Central Africa, the general name given to the British protectorates in South Central Africa, but more particularly to the large protectorate on the Shire and about Lake Nyasa. In 1907 the official title of this territory was changed to Nyasaland (which see).

British Columbia, a British colony in the southwestern section of Canada and forming with Vancouver Island a province of the Dominion of Canada. It is situated partly between the Rocky Mountains and the Pacific, partly between Alaska and the meridian of 120° w., and extends from the U. S. boundary north to the 60th parallel N. lat. Area, 372,630 sq. miles (including Vancouver Island). Till 1858 it was part of the Hudson Bay Territory; in that year gold discoveries brought settlers, and it became a colony. Vancouver Island, 16,000 sq. miles, became a colony at the same time, but was afterwards joined to British Columbia; the conjoined colony entered the Dominion as a province in 1871. The coast-line is much indented, and is flanked by numerous islands, the Queen Charlotte Islands being the chief after Vancouver.

The interior is mountainous, being traversed by the Cascade Mountains near the coast, and by the Rocky Mountains further west. There are numerous lakes, generally long and narrow, and lying in the deep ravines that form a feature of the surface and are traversed by numerous rivers. Of these the Fraser, with its tributary the Thomson, belongs entirely to the colony, as does also the Skeena; while the upper courses of the Peace River and of the Columbia also belong to it. All except the Peace find their way to the Pacific. Its mountain ranges (highest summits: Mount Forbes, 13,400 feet, and Mount Brown, 16,000 feet) afford magnificent timber (including the Douglas pine and many other trees); and between the ranges are wide grassy prairies. Part of the interior is so dry in summer as to render irrigation necessary, and the arable land is comparatively limited in area, but there is a vast extent of splendid pasture land. The climate is mild in the lower valleys, but severe in the higher levels; it is very healthful. The chief products of the colony are gold, coal, silver, iron, copper, galena, mercury, and other metals: timber, furs, and fish, the last, particularly salmon, being very abundant in the streams and on the coasts. Gold exists almost everywhere, but has been obtained chiefly in the Cariboo district. The total yield since 1858 has been over \$150,000,000. The coal is found chiefly in Vancouver Island, and is mined at Nanaimo where large quantities are now raised. Mining, cattle-rearing, agriculture, fruit-growing, salmon-canning, and lumbering are the chief industries. Victoria, on the S. E. coast of Vancouver Island, is the capital and chief town of the colony. Near Victoria is Esquimalt, a British naval station. Vancouver, the terminus of the Canadian Pacific Railway, at the mouth of the Fraser, has grown with much rapidity, and had in 1911 a population of 123,902. Other towns of some importance are New Westminster, Nanaimo, and Rossland. Besides this railway there is one between Nanaimo and Victoria, and construction by the Grand Trunk, Canadian Northern, and Canadian Pacific systems has been active. Steamers now run to China and Japan in connection with the Canadian Pacific Railway, and lines to Australia, Honolulu, etc., are in operation. Like the other provinces of the dominion, British Columbia has a separate Parliament and administration. (See *Canada*.) Schools are supported entirely by government. Pop. in 1881, 65,954, including about 25,000 Indians; (1911) 392,480.

British East Africa, includes the East Africa protectorates and the islands of Zanzibar and Pemba, and is bounded, E., by the Indian Ocean, Abyssinia and Italian Somaliland; S., by German East Africa and Lake Victoria Nyanza; W. by the Congo Free State and French Ubangi, and N. it merges into the Egyptian Sudan. It has a total area of more than 1,000,000 sq. miles and a population of over 5,000,000, including little over a thousand Europeans. It is largely an elevated plateau, traversed by the upper Nile and other rivers, and with lofty mountain masses. It contains, in whole or part, Lakes Victoria, Albert, and Albert Edward (Nyanza), Rudolf, etc. A large part of the surface is covered with grass and well suited for ranching purposes. Iron and copper are abundant in the Uganda region, and the chief products and exports are ivory, rubber, gum copal, hides, cattle and goats. Its animals include many species of antelopes, with the lion, elephant, rhinoceros, hippopotamus, buffalo, leopard, giraffe, zebra, hyena, etc., and it was the scene of Theodore Roosevelt's hunting experience in 1909-10. Capital, Mombasa. Pop. of capital about 30,000.

British Guiana (gē-á-ná), a territory on the N. W. coast of South America, with an area of about 90,277 sq. miles. It is bounded by Venezuela on the W., Dutch Guiana on the E., Brazil on the S. and the Atlantic Ocean on the N. The country is flat near the ocean, with an elevated section in the interior, where there are dense forests. The Essequibo is its longest river, and the Orinoco reaches the sea within its area. Gold is found in moderate quantities and vegetation is luxuriant, the crops including sugar-cane, rice, corn, wheat, cacao, vanilla, cinnamon and tobacco; the exports sugar, molasses, rum, cotton and lumber. Pop. about 300,000, largely Africans and East Indians. The British claim goes back to 1650, and led in the late 19th century to boundary disputes with Venezuela. The dispute continued until 1895, when President Cleveland demanded that it should be settled by arbitration. This was accomplished in 1899 and a definite boundary established.

British Gum. See *Dextrine*.

British Honduras. See *Honduras, British*.

British Museum, the great national museum in London, owes its foundation to Sir Hans Sloane, who, in 1753, bequeathed his various collections, including 50,000

books and MSS., to the nation, on the condition of £20,000—less by £30,000 than the original cost—being paid to his heirs. Montague House, which was bought for the purpose for £10,250, was appropriated for the museum, which was first opened on the 15th of January, 1759. The original edifice having become inadequate, a new building in Great Russell Street was resolved upon in 1823, the architect being Sir R. Smirke, whose building was not completed till 1847. In 1857 a new library building was completed and opened at a cost of £150,000. It contains a circular reading-room 140 feet in diameter, with a dome 106 feet in height. This room contains accommodation for 300 readers comfortably seated at separate desks, which are provided with all necessary conveniences. More recently, the accommodation having become again inadequate, it was resolved to separate the objects belonging to the natural history department from the rest, and to lodge them in a building by themselves. Accordingly a large natural history museum has been erected at South Kensington, and the specimens pertaining to natural history (including geology and mineralogy) have been transferred thither, but they still form part of the British Museum. Further additions to the Great Russell Street buildings were made in 1882. The British Museum is under the management of 48 trustees. It is open daily, free of charge. Admission to the reading-room as a regular reader is by ticket, procurable on application to the chief librarian, there being certain simple conditions attached. The library, which is now one of the largest and most valuable in the world, has been enriched by numerous bequests and gifts, among others the splendid library collected by George III, during his long reign. A copy of every book, pamphlet, newspaper, piece of music, etc., published anywhere in British territory, must be conveyed free of charge to the British Museum. The museum contains eight principal departments, namely, the department of printed books, maps, charts, plans, etc.; the department of manuscripts; the department of natural history; the department of oriental antiquities; the department of Greek and Roman antiquities; the department of coins and medals; the department of British and medieval antiquities and ethnography; and the department of prints and drawings.

British North America, a name which are included the Dominion of Canada and the colony of Newfoundland, comprising all the mainland north of the

United States (except Alaska) and a great many islands.

British South Africa. See *Union of South Africa*.

Brittany, or **BRETAGNE** (bret-ān'y'), an ancient duchy and province of France, corresponding nearly to the modern departments of Finistère, Côtes du Nord, Morbihan, Ille et Vilaine, Loire Inférieure. It is supposed to have received its name from the Britons who were expelled from England and took refuge here in the fifth century. Along the coast and towards its seaward extremity the country is remarkably rugged, but elsewhere there are many beautiful and fertile tracts. Fisheries employ many of the inhabitants. The people still retain their ancient language, which is closely allied to Welsh, and is exclusively used by the peasantry in the western part of the province.

Brittle (brit'l), **STARS** (Ophiuroidea), a class of Echinodermata not far removed from the starfishes, but with a more centralized body, longer and more sharply defined arms and greater activity. The name refers to the extreme ease with which the arms break. Another common name is *sand stars*, referring to their occasional occurrence on the shore.

Britton (brit'on), **JOHN**, an English writer on architectural antiquities, born in 1771; died in 1857. In 1801 appeared the *Beauties of Wiltshire*, in two volumes, by J. Britton and E. W. Brayley. These collaborators, with others, subsequently completed a similar work for all the other counties of England (London, 1801-16, eighteen vols.; 1825, twenty-six vols.; etc.). In 1805 Britton published his *Architectural Antiquities of England* in five 4to volumes, which was followed by his *Cathedral Antiquities*, in fourteen volumes, 1814-35, and *Dictionary of the Architecture and Archaeology of the Middle Ages*, 1832-38. A large number of works of a similar character bear his name as joint or sole author or editor.

Britzka, Britzka (britz'ka), a kind of small carriage, the head of which is always a movable calash, and having a place in front for the driver and a seat behind for servants.

Brives-la-Gaillarde (brév-lā-gā-yārd), a town of Southwestern France, dep. Corrèze, on the Corrèze, surrounded by fine boulevards planted with elms. Manufactures: woollens, cottons, candles, brandy, etc. Pop. 14,054.

Brixen (brik'sen), an old town in Austria, in Tyrol, 100 miles from Vienna by rail, with a cat. Pop. 5767.

Brixham (briks'am), a seaport and sea-bathing resort in Devonshire, on the south of T. Brixham was the place where W. III landed, Nov. 4, 1688. Pop. 79.

Briza (bri'za), a genus of grass commonly called quaking grass, with a slender, wiry stem, and a maiden's hair, or lady's tresses. There are about thirty species, chiefly from South America. Some of these are sometimes to be found in garden ornamental plants.

Broach, or **BAROACH** (brōch-rōch'), a town in Gujarat, Hindustan, on the Nerul, one of the oldest seaports of Western India, with a considerable coasting trade. The town was taken by storm by British in 1772, and, with the district, was ceded to them by treaty with Scindia in 1803. Pop. 42,300.

Broach (brōch, French *broche*), a term sometimes applied to a spire that springs from a tower, there being no intermediate parapet.

Broad Arrow, a government mark, placed on the ground to denote the location of stores of every description (as well as some other things), to distinguish them as public or crown property, and to obliterate or deface which is felony. Persons in possession of goods marked with the broad arrow forfeit the goods and are subject to a penalty. The origin of the mark is clearly known.

Broadcast (brad'cast), a mode of sowing grain by which seed is cast or dispersed upon the ground with the hand or with a machine instead of for sowing in this manner; opposed to planting in drills or rows.

Broad Church, a name given to the Church of England, assuming a midway between the Low Church or Evangelical section and the High Church or Ritualistic; now widely applied to the more tolerant and liberal sections of any denomination.

Broad Piece, a name sometimes given to English pieces broader than a guinea, particularly Caroluses and Jacobuses.

Broadside (brad'sid), in a military engagement, the whole force in charge of the artillery on one side of a ship of war. The term is also ap-

Broadside

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a cathedral.

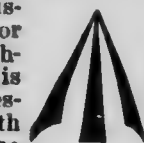
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a sheet of paper, and, strictly, not divided
into columns.

Broad'stairs, an English watering-
place, east coast of
Kent, 2 miles N. of Ramsgate. Pop.
(with St. Peter's), 8929.

Broad'sword, a sword with a broad
blade, designed chiefly
for cutting, formerly used by some regi-
ments of cavalry and Highland infantry
in the British service. The claymore
or broadsword was the national weapon
of the Highlanders.

Brocade (brö-käd'), a stuff of silk, en-
riched with raised flowers,
foliage, or other ornaments. The term
is restricted to silks figured in the loom,
distinguished from those which are em-
broidered after being woven. Brocade is
in silk what damask is in linen or wool.

Broccoli (brok'o-li), a late variety of
the cauliflower, hardier and
with more color in the flower and leaves.

Brocks (broks), the local name of the
ancient circular castles of
Scotland known also as duns and to
antiquaries as 'Pictish towers.' They
are numerous in northern Scotland and
are supposed to date from about the sixth
to the tenth centuries. They were ap-
parently places of refuge for the rural
population when attacked by marauders,
and have thick stone walls and other
means of defense.

Brocken (brok'en), the highest sum-
mit of the Harz Mountains
(3742 feet), in Prussian Saxony, cele-
brated for the atmospheric conditions
which produce the appearance of gigantic
spectral figures in the clouds, being
shadows of the spectators projected by
the morning or evening sun.

Brockhaus (brok'hous), FRIEDRICH
ARNOLD, founder of the
eminent German publishing house still
carried on by his grandsons, was born
in 1772; died in 1823. In 1811 he settled
at Altenberg, where the first edition of
the *Conversations-Lexikon* was com-
pleted, 1810-11. The business rapidly
extended, and he removed to Leipzig in
1817. There are now chief branches in
Berlin and Vienna, and among the
literary undertakings of the house have
been several important critical periodicals
and some large historical and bibliograph-
ical works. The *Conversations-Lexikon*
distinctively associated with the name of
Brockhaus has now reached a thirteenth
edition.—HERMANN BROCKHAUS, son of
F. A. Brockhaus, orientalist, was born at
Amsterdam in 1806; died in 1877. From
1848 till his death he was professor of
Sanskrit at Leipzig, and published many

Broglie

works on oriental literature. He edited
the great *Allgemeine Encyclopädie* of
Ersch and Gruber, published now by his
father's firm.

Brockton (brok'ton), a city of Ply-
mouth Co., Massachusetts,
formerly North Bridgewater, 20 miles S.
of Boston. It has very large shoe factor-
ies, employing 15,000 hands, also manu-
factures of lasts, dies, blacking, machin-
ery, webbing, boxes and all accessories en-
tering into the manufacture of shoes.
Pop. 56,878.

Brockville (brok'vil), a town of
Canada, prov. of On-
tario, on the left bank of the St. Law-
rence, about 40 miles below Kingston.
It is a station on the Grand Trunk
Railway, and has considerable hardware
and other manufactures, as steam engines,
chemicals, agricultural implements, etc.
Pop. (1911) 9372.

Brodie (brö'dii), SIR BENJAMIN COL-
LINS, an English surgeon,
born in 1783; died in 1862. He was the
leading surgeon of his day, and attended
George IV, and was sergeant-surgeon to
William IV and to Victoria. He was
made a baronet in 1834; from 1858 to
1861 was president of the Royal Society,
and was connected with many other
scientific and learned societies. He pub-
lished a number of works connected with
his profession.—His eldest son, SIR BEN-
JAMIN COLLINS BRODIE, a celebrated
chemist, was born in London 1817, died
1880. In 1855 he was appointed pro-
fessor of chemistry at Oxford.

Brody (brö'di), a town in Austrian
Galicia, near the Russian
frontier, 58 miles E.N.E. of Lemberg.
It has 17,360 inhabitants, about three-
fourths of whom are Jews. The com-
merce with Russia and Turkey is im-
portant.

Broglie (brol-yè), a family of Italian
origin, distinguished in the
annals of French wars and diplomacy.—
1. FRANÇOIS MARIE, DUC DE, marshal of
France, born in 1671; died in 1745; was
highly distinguished in the field, and also
in diplomacy.—2. VICTOR FRANÇOIS, DUC
DE, eldest son of preceding, likewise mar-
shal of France, born in 1718; died in
1804; served in Italy, Bohemia, Bavaria,
and Flanders. Was minister of war for
a short time in 1789, and took part in the
invasion of Champagne, 1792.—3. CLAUDE
VICTOR, PRINCE DE, born in 1757; guil-
lotined 27th June, 1794; was the third
son of Victor François. He entered at
first into the views of the revolutionary
party, and was appointed field-marshal in
the army of the Rhine, but upon his
refusal to acknowledge the decrees of the

10th of August suspending the royal authority was deprived of his command, and afterwards summoned before the revolutionary tribunal and led to the guillotine.—4. **ACHILLE LÉONCE VICTOR CHARLES, DUC DE**, peer of France, son of Claude Victor, born in 1785; died in 1870. In 1816 he married a daughter of Madame de Staël, and was made a member of the chambers of peers. After the revolution of 1830 the Duc de Broglie and Guizot were the chiefs of the party called *Doctrinaires*. He was minister of public instruction for a short time in 1830, and minister of foreign affairs from October 1832, to April, 1834. In 1849 he was a conservative member of the Legislative Assembly, and after the *coup d'état* he continued a bitter enemy of the imperial régime. His latter years were devoted to philosophical and literary pursuits, and in 1856 he was elected a member of the French Academy.—5. **ALBERT, DUC DE**, son of the preceding, statesman and author, born in 1821. His principal work, *The Church and the Roman Empire in the Fourth Century*, has passed through many editions. He served as ambassador at London, minister of foreign affairs, and head of a short-lived socialist ministry in 1877. He died in 1901.

Brogue (brög; Ir. and Gael. *brog*), a coarse and light kind of shoe made of raw or half-tanned leather, of one entire piece, and gathered round the foot by a thong, formerly worn in Ireland and the Highlands of Scotland. The term is also used of the mode of pronunciation of English words peculiar to the Irish.

Broke (bruk), **SIR PHILIP BOWES VERE**, a British admiral, born in 1776; died in 1841; distinguished himself, particularly in 1813, as commander of the *Shannon*, in the memorable action which that vessel, in answer to a regular challenge, fought with the United States vessel *Chesapeake* off the American coast, and in which the latter was captured.

Broken Wind, a disease in horses, one often accompanied with an enlargement of the lungs and heart, which disables them for bearing fatigue. In this disease the expiration of the air from the lungs occupies double the time that the inspiration of it does; it requires also two efforts rapidly succeeding to each other, attended by a slight spasmodic action, in order fully to accomplish it. It is caused by rupture of the air-cells, and there is no known cure for it.

Broker (brök'er), an agent who is employed to conclude bargains

or transact business for others in consideration of a charge or compensation which is usually in proportion to the extent or value of the transaction completed by him, and is called *broker*. In large mercantile communities the business of each broker is usually limited to a particular class of transactions, and thus there are brokers several distinctive names, as *bill brokers*, who buy and sell bills of exchange; *others*; *insurance brokers*, who negotiate between underwriters and the owners of vessels and shippers of goods; *brokers*, who are the agents of owners of vessels in chartering them to merchants or procuring freights for them from port to another; *stock brokers*, the agents of dealers in shares of joint-stock companies, government securities, and of monetary investments.

Bromberg (brom'bërg), a town in Prussia, province of Posen, on the Brahe, near its confluence with the Vistula. Among its industries are machinery, iron-founding, tannery, paper, tobacco, chicory, pottery, distilling and brewing. The Bromberg Canal connects the Brahe with the Netz, and establishes communication with Vistula, the Oder, and the Elbe. 54,229.

Brome (bröm), **ALEXANDER**, a man of English poet and dramatist, born in 1620; died in 1666. He was author of many royalist songs and epigrams. Published *The Cunning Men*, a comedy; *Fancy's Festivals*, &c.; *Translation of Horace*.

Brome, **RICHARD**, poet and dramatist, died in 1652. He wrote *Jovial Crew*, *The Northern Lass*, many other plays, ten of which were edited and published by Alexander Brome soon after his death. He was originally a servant of Ben Jonson's, on whose style he endeavored to mold his own.

Brome-grass, the name given to the grasses of the genus *Bromus*. Nearly 200 species have been described, occurring both in the Old and the New World. They are known having their spikelets many-flowered, awnless glumes to each floret, two per valve, the lowermost of which has a rough, straight, rigid awn proceeding from below the tip of the valve. They are not held in much estimation by the farmer, but an Australian species, *Schraderi*, is strongly recommended as a forage plant.

Bromeliaceæ (brö-me-li-ä'se-æ), a natural order of endogenous plants, taking its name from the genus *Bromelia*.

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(so called after a Swedish botanist, Olaus Bromel) to which the pineapple was once incorrectly referred, and consisting of herbaceous plants remarkable for the hardness and dryness of their gray foliage. They abound in tropical America, commonly growing epiphytically on the branches of trees. With the exception of the pineapple (*Ananassa sativa*), the Bromeliaceæ are of little value, but some species are cultivated in hothouses for the beauty of their flowers. They can exist in dry hot air without contact with the earth, and in hothouses are often kept hung in moist moss.

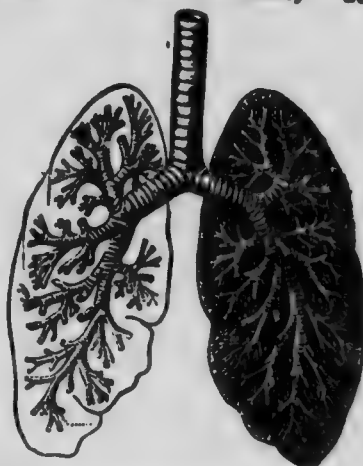
Bromine (brō'min, brō'min; Gr. *brōmos*, a fetid odor), a non-metallic element discovered in 1826; symbol Br, atomic weight 80. In its general chemical properties it much resembles chlorine and iodine, and is generally associated with them. It exists, but in very minute quantities, in seawater, in the ashes of marine plants, in animals, and in some salt springs. It is usually extracted from bittern by the agency of chlorine. At common temperatures it is a very dark reddish liquid, has a powerful and suffocating odor, is fuming, volatile, and corrosive, and emits a red vapor. It has bleaching powers like chlorine, and is very poisonous. Its density is about four and a half times that of water. It combines with hydrogen to form *hydrobromic acid* gas, which is colorless, acrid, and irritating, and soluble in water. With oxygen and hydrogen it forms *hypobromous*, *bromous* and *bromic acids*. *Bromide of potassium* (KBr) has sedative properties, and is used in medicine; *bromide of silver* is used in photography.

Bromley (brom'li), a town of England, County Kent, 8 miles s.e. of London, with a hospital for forty widows of clergymen, and a palace formerly belonging to the Bishop of Rochester. A mineral spring, St. Blaize's Well, has had reputation since before the Reformation. Pop. (1911) 33,649.

Bromsgrove (broms'grōv), a town of England, in the county of Worcester, 13 miles s.w. of Birmingham, on the left bank of the Salwarp. Nailmaking is the chief industry; there are also chemical works, a cloth-button manufactory, etc. Pop. (1911) 8928.

Bronchi (bron'ki), the two branches into which the trachea or windpipe divides in the chest, one going to the right lung, the other to the left, and ramifying into innumerable smaller tubes—the *bronchial tubes*,

Bronchitis (bron-ki'tis), an inflammation of the mucous membrane of the bronchial tubes, or the air-passages leading from the trachea to the lungs. (See *Bronchi*.) It is of



Bronchi and their Ramifications.

common occurrence, and may be either acute or chronic. Its symptoms are those of a feverish cold, such as headache, lassitude, and an occasional cough, which are succeeded by a more frequent cough occurring in paroxysms, expectoration of yellowish mucus, and feeling of great oppression on the chest. Slight attacks of acute bronchitis are frequent and not very dangerous. Acute bronchitis is often a formidable malady, and requires prompt treatment. Confirmed chronic bronchitis requires considerable medical treatment. Its main symptoms are cough, shortness of breath and expectoration. It is particularly apt to attack a person in winter; and in the end may cause death through the lungs becoming incapacitated for their work and through accompanying complications.

Bronchocele (bron'ko-sēl). See *Goiter*.

Brongniart (bron-nyār), ALEXANDRE, a French geologist and mineralogist, born in 1770; died in 1847. He was appointed in 1800 director of the porcelain manufactory at Sevres. In 1807 appeared his *Traité Élémentaire de Minéralogie*; and with Cuvier he wrote *Description Géologique des Environs de Paris*. He also wrote other works on mineralogy and geology, and in 1844 appeared his *Traité des Arts Céramiques*. He was a member of the Academy of Sciences, and in 1822 succeeded Haüy as professor of mineralogy in the Museum of Natural History.—His son, ADOLPHE THEODORE BRONGNIART, born in 1801;

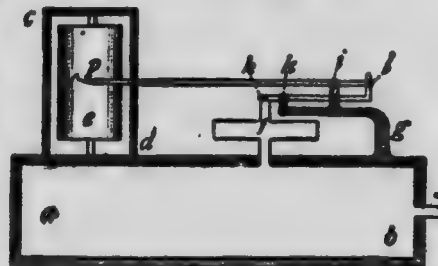
died in 1876; became professor of botany at the Jardin des Plantes, Paris, in 1833; and was the author of several botanical works held in high esteem.

Bronte (bron'tà), a town of Sicily, 22 miles N. N. W. of Catania, in a picturesque situation at the W. base of Mount Etna. Lord Nelson was created Duke of Bronte by the Neapolitan government in 1799. Pop. 20,366.

Bronte (bron'tè), CHARLOTTE (afterwards MRS. NICHOLLS), an English novelist, born at Thornton, in Yorkshire, 21st April, 1816; died at Haworth, 31st March, 1855. She was the third daughter of the Rev. Patrick Bronte, rector of Thornton, and afterwards of Haworth, a moorland village in the West Riding of Yorkshire, about 4 miles from Keighley. In 1842 Charlotte went with her sister Emily to Brussels, with the view of acquiring a knowledge of the French and German languages, and she subsequently taught for a year in the school she had attended there. In 1844 arrangements were entered into by her and her sisters Anne and Emily to open a school at Haworth, but from the want of success in obtaining pupils no progress was ever made with their scheme. They resolved now to turn their attention to literary composition; and in 1846 a volume of poems by the three sisters was published, under the names of Currer, Ellis, and Acton Bell. It was issued at their own risk, and attracted little attention, so they quitted poetry for prose fiction, and produced each a novel. Charlotte (Currer Bell) entitled her production *The Professor*, but it was everywhere refused by the publishing trade, and was not given to the world till after her death. Emily (Ellis Bell) with her tale of *Wuthering Heights*, and Anne (Acton Bell) with *Agnes Grey*, were more successful. Charlotte's failure, however, did not discourage her, and she composed the novel of *Jane Eyre*, which was published in October, 1847. Its success was immediate and decided, giving her an international reputation. Her second published novel, *Shirley*, appeared in 1849. Previous to this she had lost her two sisters, Emily dying on 19th Dec., 1848, and Anne on 28th May, 1849 (after publishing a second novel, the *Tenant of Wildfell Hall*). In the autumn of 1852 appeared Charlotte's third novel, *Villette*. Shortly after, she married her father's curate, the Rev. Arthur Bell Nicholls, but in nine months died of consumption. Her originally rejected tale of *The Professor* was published after her death, in 1857, and the same year a biography of

her appeared from the pen of Gaskell.

Brontograph (bron'tò-gráf), an apparatus devised by Marvin for recording any wave of sound.



MARVIN'S BRONTOGRAPH.

a b, large metallic box to which the frame of the rapidly revolving cylinder c, the aneroid f, the post g, the pivots h and i, are firmly attached. The levers k l and l p cause the pen p to make a magnified record of the motion of the pivot k attached to the upper movable face of the aneroid box. The air within the box is first brought into equilibrium with the outside air by opening and closing the stopcock a before an observation is to be made. A wave of compression and expansion causes external air to contract and expand; the aneroid pivot k, and eventually the pen, follow changes sluggishly but still approximately. Rapid or high-pitch sound-waves cannot be recorded by this brontograph.

such as thunder, or the report of a cannon.

Brontosaurus (bron-tò-sà'rus), a gigantic reptilian animal, of the order Dinosauria, fossil in secondary strata of the Red Mountains, having a long neck and a very small head, and strong limbs. **Bronze**, an alloy of copper and tin, to which other metallic substances are sometimes added, especially



Vessels of the Bronze Period.

since. It is a fine-grained metal, takes a smooth and polished surface, has

Bronze

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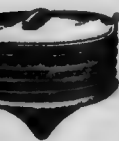
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Bronze Age

and more fusible than copper, but not so malleable. In various parts of the world weapons and implements were made of this alloy before iron came into use, and hence the *bronze age* is regarded as one coming between the *stone age* and the *iron age* of prehistoric archaeology. (See *Archæology*.) Both in ancient and modern times it has been much used in making casts of all kinds, medals, bas-reliefs, statues, and other works of art; and varieties of it are also used for bells, gongs, reflectors of telescopes, cannon, etc. Its color is reddish, brownish, or olive-green, and is darkened by exposure to the atmosphere. Ancient bronze generally contains from 4 to 15 per cent of tin. The alloy of the present British bronze coinage consists of 95 parts of copper, 4 of tin, and 1 of zinc. An alloy of about 85 parts copper, 11 zinc, and 4 tin is used for statues. Bell-metal consists of 78 of copper and 22 of tin. An alloy called *phosphor bronze*, consisting of about 90 per cent. of copper, 9 of tin, and from 0.5 to 0.75 of phosphorus has been found to have peculiar advantages for certain purposes. The addition of phosphorus increases the homogeneity of the compound, and by varying the proportion of the constituents the hardness, tenacity, and elasticity of the alloy may be modified at pleasure.—*Aluminium bronze* is an alloy of copper and aluminium, the metals being combined in different proportions according to the kind of bronze wanted. One variety is of a yellow or golden color, and is made into watch-chains and ornamental articles.—*Manganese bronze* is a bronze containing manganese and iron, and is said to possess remarkable properties in regard to strength, hardness, toughness, etc.—*Bronzing* is the operation of covering articles with a wash or coating to give them the appearance of bronze. Two kinds are common, the yellow and the red. The yellow is made of fine copper dust, the red of copper dust with a little pulverized red ochre. The fine green tint which bronze acquires by oxidization, called *patina antiqua*, is imitated by an application of sal ammoniac and salt or sorrel dissolved in vinegar. Recently bronze has been deposited on small statues and other articles with good effect by means of the electrolytic process.

Bronze Age. See *Bronze*.

Bronze-wing, a name for certain pigeons, chiefly of species of Australian distinguished by the genus *Phaps*, distinguished by the bronze color of their plumage. The common bronze-winged

Brook Farm

ground-dove (*P. chalcoptera*) abounds in all the Australian colonies, and is a plump bird, often weighing a pound, much esteemed for table.

Bronzing. See *Bronze*.

Brooch (bröch), a kind of ornament worn on the dress, to which it is attached by a pin stuck through the fabric. They are usually of gold or silver, often worked in highly artistic patterns and set with precious stones. Brooches are of great antiquity, and were formerly worn by men as well as women, especially among the Celtic races. Among the Highlanders of Scotland there are preserved in several families ancient brooches of rich workmanship and highly ornamented. Some of them seem to have been used as a sort of amulet or talisman.

Brooke (brük), HENRY, dramatist and novelist, the son of an Irish clergyman, was born in 1703; died in 1783. He was educated at Dublin University, and numbered Swift, Pope, and Garrick among his friends. In 1745 he was made barrack-master at Mullingar, and spent the rest of his life in literary work. He wrote many plays and novels, his chief novel being *The Fool of Quality*.

Brooke, SIR JAMES, celebrated as the Rajah of Sarawak, was born in Bengal in 1803, and died in Devonshire in 1868. In 1838, having gone to Borneo, he assisted the Sultan of Brunei (the nominal ruler of the island) in suppressing a revolt. For his services he was made Rajah and Governor of Sarawak, a district on the s. w. coast of the island, and being established in the government he endeavored to induce the Dyak natives to abandon their irregular and piratical mode of life and to turn themselves to agriculture and commerce; and his efforts to introduce civilization were crowned with wonderful success. He was made a K.C.B. in 1847.

Brooke (brük), JOHN R., an American soldier, born in Pennsylvania in 1839. He enlisted in the army at the outbreak of the Civil war, and rose in rank by 1864 to brigadier-general of volunteers. In 1897 he was made major-general in the regular army and took part in the Porto Rico campaign of 1898, being afterwards made governor-general of that island and in Dec., 1898, governor-general of Cuba. He was placed on the retired list in 1902.

Brook Farm, a social community, principles of communism, formed on Fourier's Boston, organized in 1840 by George

Ripley, as an outcome of the Transcendental movement of that time. It was notable for the distinguished persons who were interested in it, including Emerson, Hawthorne, Alcott, Curtis, Dana, Margaret Fuller, and other prominent Bostonians. Business ability was lacking and the enterprise was abandoned in 1847. The romantic aspects of life in this community form the basis of Hawthorne's *Blithedale Romance*.

Brookfield (bruk'fēld), a city of Linn Co., Missouri, on Yellow Creek, 104 miles W. of Hannibal. Coal is mined in the vicinity, and it has ironworks, railroad machine shops, shoe factory and an active shipping trade in grain and live stock. Pop. 5749.

Brookhaven, a township (town), of Suffolk Co., Long Island N. Y., 58 miles E. of Brooklyn; a congregation of villages, chief among them Patchogue. Pop. 16,737.

Brooklime (bruk'lim; *Veronica Beccabunga*), a European plant, with blue flowers, common in ditches and wet places in Britain, a species of speedwell. It is sometimes used in salads.

Brookline (bruk'lin), a town of Norfolk Co., Massachusetts, in the close vicinity of Boston, with which it is connected by electric and steam railways; forming part of what is designated Greater Boston. Here are many elegant suburban residences, surrounded by beautiful grounds, its chief industry being the manufacture of electrical appliances. Pop. 27,792.

Brooklyn (bruk'lin), a former city, which on Jan. 1, 1898, became a part of New York city. It is situated on the west end of Long Island, separated from Manhattan by East River, a strait about three-quarters of a mile broad, crossed by steam-ferries and by four bridges and with railway tunnels beneath its bed. It has broad, straight streets, many of them planted with rows of trees, a river-front of nearly 9 miles, and covers an area of 16,000 acres. It is popularly known as the 'city of churches,' having about 300 of all denominations. Among the public buildings are the borough hall, of white marble, the jail, the county courthouse, the academy of music, etc. The literary and charitable institutions are very numerous. The Atlantic Dock is one of the largest in the States, covering 40 acres. The United States navy yard, on Wallabout Bay, occupies 45 acres. Brooklyn is a favorite residence of the wealthy New Yorkers. It has a large trade and numerous manufactures. Pop. (1900)

1,168,582; (1910) 1,678,776. See New York.

Brooks (bruks). **CHARLES SHIRLEY**, English novelist and journalist, born in 1815; died in 1874. wrote many plays and novels.

Brooks, **PHILLIPS**, bishop, was born in Boston, Massachusetts, 1835, and became one of the most widely known clergymen of the American Protestant Episcopal Church. In England he received honorary degrees from Oxford and Cambridge. He held rectories in Philadelphia from 1859 to 1874 and in the latter year accepted a torate in Boston, where in 1891 he elected Bishop of Massachusetts Diocese. He died Jan. 23, 1893.

Brooks, **WILLIAM KEITH**, naturalist, born at Cleveland, Ohio, 1848. In 1876 he became an associate of Johns Hopkins University and in 1880 director of its marine laboratory. His works include *Handbook of Marine Zoology*, *Heredity*, *The Oyster in America*, etc. He died in 1908.

Broom, a popular name which includes several allied genera of plants of the natural order Leguminosae and of the suborder Papilionaceae, distinguished by a leguminous fruit papilionaceous flowers. The common broom of Europe (*Cytisus scoparius*) is a bushy shrub with straight branches, of a dark-green color, dense leaves, and flowers of a deep yellow. Its twigs are often made into brooms, and are used as thatch for hives and corn-stacks. They have also been used for tanning. The whole plant has a very bitter taste, and a decoction is diuretic, in strong doses emetic. *White broom* or *Portugal broom* (*Genista tinctoria*) has beautiful white flowers. *Spanish broom* or *spart* (*Aspalathus juncea*) is an ornamental flowering shrub growing in Africa, Spain, and the S. of France, and often cultivated in English gardens. It has upright, round branches, that flower at the tips, and spear-shaped leaves. Its fibers are made into various textile fabrics, and also used in paper-making. *Butter broom* (*Genista tinctoria*) yields a low color used in dyeing.—*Butter broom* is *Ruscus aculeatus*, an evergreen shrub of the order Liliaceae, and is entirely different from the broom proper.

Broom-corn, Broom-grass

(*Syntherisma sanguinalis*, *Syntherisma sanguinalis*, or Guinea corn), a grass of the order of grasses, with a jointed stem, rising to the height of 8 or 10 feet, extensively cultivated in N. Am.

See New

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grass (Sor- ghum corn), a plant with a jointed of 8 or 10 feet. N. America,

Brother Jonathan

where the branched panicles are made into carpet-brooms and clothes-brushes. The seed is used for feeding poultry, cattle, etc.

Brother Jonathan, a popular term applied to the people of the United States, as 'John Bull' is to the people of England. It has the following origin: Washington, on assuming command of the New England revolutionary forces, was in great straits for arms and war material. The governor of Connecticut, Jonathan Trumbull, was a man of excellent judgment and an esteemed friend of Washington. In the emergency Washington said 'we must consult Brother Jonathan.' This expression was repeated on other serious occasions, and became a convenient name for the whole people.

Brothers (bruth'ers), a term applied to the members of monastic and military orders as being united in one family. Lay brothers were an inferior class of monks employed in monasteries as servants. Though not in holy orders, they were bound by monastic rules.

Brothers, RICHARD, an English fanatic and self-styled prophet, born about 1760; died in 1824. He served as lieutenant in the army, which he quitted in 1789, refusing from conscientious scruples to take the oath necessary to entitle him to his half-pay. He announced himself in 1793 as the apostle of a new religion, dating his call from 1790. He styled himself the 'Nephew of the Almighty, and Prince of the Hebrews, appointed to lead them to the land of Canaan.' He published in 1794 *A Revealed Knowledge of the Prophecies and Times*, in two books. He was committed to Newgate for prophesying the death of the king, and subsequently to Bedlam as a dangerous lunatic, but was released in 1806.

Brough (bruf), **CHARLES ALLAN LA TOUCHE**, son of Hon. Secker Brough, Judge of Court of Probate, Toronto, Canada, a British lawyer and colonial administrator. He was educated at the Upper Canada College, University of Toronto, and University of Durham. He became mayor of Suva, Fiji, in 1906.

Brough, JOHN (1811-65), an American statesman, born at Marietta, Ohio. He studied law, and after entering politics gained renown as a Democratic orator. He was nominated for governor in 1864 by the Republican Union party and was elected by a tremendous majority. He held office during part of the Civil war and was called the 'war governor' of his state.

Brougham

Brough, LAONEL (1836-1900), an English actor, born at Pontypool, Monmouthshire. He began his career as a journalist, but forsook literature for the stage, making his first appearance in 1854 in *Prince Pretty Pet*. He appeared in numerous comedy rôles, including *She Stoops to Conquer* and *Trilby*.

Brougham (bröm or brö'em), a close four-wheeled carriage, with a single inside seat for two persons, glazed in front and with a raised driver's seat, named after and apparently invented by Lord Brougham.

Brougham (bröm or brö'em), **HENRY, BARON BROUGHAM AND VAUX**, was born at Edinburgh 19th September, 1778; died at Cannes, 7th May, 1868. He was educated at Edinburgh, studied law there, and was admitted a member of the Society of Advocates in 1800. Along with Jeffrey, Horner, and Sydney Smith he bore a chief part in the starting of the *Edinburgh Review* in 1802, to which he contributed a great number of articles. Finding Edinburgh too circumscribed a field for his abilities, he removed to London, and in 1808 was called to the English bar. In 1810 he entered Parliament as member for the borough of Camelford, joined the Whig party, which was in opposition, and soon after obtained the passing of a measure making the slave trade a felony. From 1812 until 1816 he remained without a seat, when he was returned for Winchelsea. He represented this borough up to 1830. On his return to parliament he at once began an agitation for social, political, and especially educational reform. In 1825 he was elected Lord Rector of Glasgow University, and also introduced a bill into parliament for the incorporation of the London University, of which he may be considered one of the chief founders. He also bore an active part in establishing the Society for the Diffusion of Useful Knowledge in 1827. Meantime his reputation as a brilliant speaker and able barrister had been gradually increasing, and his fearless and successful defense of Queen Caroline in 1820 and 1821 placed him on the pinnacle of popular favor. At the general election of 1830 he was returned for the large and important county of York. In the ministry of Earl Grey he accepted the post of lord-chancellor, and was raised to the peerage (22d Nov., 1830) with the title of Baron Brougham and Vaux. In this post he distinguished himself as a law reformer, and aided greatly in the passing of the Reform Bill of 1832. In 1834 the Whig ministry was dismissed, and this proved the end of his official life, as he was never afterwards a

Brougham

member of any ministry, though for years he continued an active member of the House of Lords. Lord Brougham accomplished a large amount of literary work, contributing to newspapers, reviews, and encyclopedias, besides writing several independent works; and he had no mean reputation in mathematics and physical science. His works, collected by himself, and published in eleven vols. (1857-60), include biographical, political, rhetorical and other productions, to which he added an autobiography published posthumously under the title: *Life and Times of Henry, Lord Brougham*.

Brougham, JOHN, actor and dramatist; born at Dublin in 1810; died at New York in 1880. He wrote upwards of a hundred pieces, including *The Game of Life*, *Romance and Reality*, *Love's Livery*, *The Duke's Motto*, etc., and contributed largely to periodicals. He was well known as an actor both in England and in America.

Broughton (brou'tun), JOHN CAM HOBHOUSE, LORD, English writer and statesman; born in 1786; died in 1869. He was the son of Sir Benjamin Hobhouse, and was an intimate friend of Lord Byron, whom he accompanied in his travels to Greece and Turkey in 1809. He published in 1812 *Journeys into Albanian and other Provinces of the Turkish Empire*. He also accompanied Byron to Italy in 1816-17, and wrote *Historical Illustrations of the Fourth Canto of Childe Harold*. In 1816 he published *Letters on the Hundred Days, or Last Reign of Napoleon*. He entered parliament in 1819 as member for Westminster. In 1832 he entered Lord Melbourne's ministry as secretary of war and became a privy-councilor. In 1833 he was made chief secretary for Ireland, and in 1835 he was appointed president of the board of control. He held this office till Sept., 1841, and in Lord Russell's administration, 1846-52. He was raised to the peerage as Baron Broughton in 1851.

Broughton, RHODA, novelist, born in Wales in 1840. Among her works are *Red as a Rose is She*, *Second Thoughts*, *Dr. Cupid*, etc.

Broughty-Ferry (bra'ti), a town of Scotland, County Forfar, N. shore of the estuary of the Tay, 3 miles E. Dundee, so called from a ferry across the Tay to Ferry-port-on-Craig, in Fifeshire. Here are many mansions belonging to the merchants and manufacturers of Dundee, and it is resorted to as a bathing-place. At the east end of the town is the old castle

of Broughty, with guns, etc., for the defense of the Tay. Pop. 10,484.

Broussa (brö'sä). See *Brusa*.

Broussais (brö-sä), FRANÇOIS JOSEPH VICTOR, a French physician, born in 1772; died in 1838. He is regarded as the founder of what was called the physiological system of medicine. According to his theory, irritability is the fundamental property of all living animal tissues, and every malady proceeds from an undue increase or diminution of that property.

Broussonet (brö-so-nä), PIERRE MARIE AUGUSTE, a French naturalist, born in 1761; died in 1807. He lived for some time in England, and was a friend of Sir Joseph Banks. He published *Ichthyologia*, and *Memoirs towards the History of the Respiration of Fishes*. He was professor of botany at Montpellier, and a member of the Academy of Sciences.

Broussonetia (brö-so-nä'ti-a), a genus of trees, nat. order Moraceæ, or mulberries, the paper-mulberry. See *Mulberry*.

Brouwer (brou'ver), or BRAUWER, ADRIAAN, a Dutch painter, born in 1608; died in 1640. He was a pupil of Frans Hals, and was patronized by Rubens; but was of very dissipated habits. His works are chiefly tavern scenes and other delineations of low life, and rank among the best of their kind.

Brown (broun), a color which may be regarded as a mixture of red and black, or of red, black and yellow. There are various brown pigments, mostly of mineral origin, as bistre, umber, cappagh brown, etc.

Brown, CHARLES BROCKDEN, one of the earliest able American novelists, was born in Philadelphia in 1771; died 1810. He was destined for the law, but the term intended for preparatory legal study was principally occupied with literary pursuits. His novel *Wieland, or the Transformation*, was published in 1798; *Ormond*, or *the Secret Witness*, in 1799; and *Arthur Mervyn* in 1800. In the last-named work the ravages of the yellow fever, which the author had witnessed in New York and Philadelphia, are painted with horrid ing detail. He was originator of the *Monthly Magazine and American Review* (1799-1800). He also founded in 1806 the *Literary Magazine and American Register*, which he edited for five years. Among his other works are *Clara Howard* (1801) and *Jane Talbot* (1804).

Brown, FORD MADDOX, an English painter, grandson of Dr. John

Brown

Brown, of Edinburgh, the author of the Brunonian system of medicine (born 1821; died 1893). In 1844 and 1845 he contributed (unsuccessfully) cartoons of the *Finding of the Body of Harold, Justice*, and other subjects to the competitive exhibition for the frescoes of the houses of parliament. Among his principal works are: *King Lear*; *Chaucer at the Court of Edward III*; *The Last of England*; *Work*; *Cordelia's Portion*; the Manchester townhall frescoes, etc. He is generally rated as a pre-Raphaelite, but though a close intimacy existed between him and the brotherhood, he never actually joined them.—His son, **OLIVER MADOX BROWN** (born 1855, died 1874), from early boyhood showed remarkable capacity both in painting and literature, especially prose fiction and poetry. His *Literary Remains* were published in 1876.

Brown, **FRANCIS** (1840-1916), an American theologian, born at Hanover, N. H. He was graduated from Dartmouth College in 1870, and Union Theological Seminary, N. Y., in 1877. He became instructor in Biblical philology in Union Seminary in 1879, associate professor in 1881, professor of Hebrew and cognate languages in 1890. In May, 1908, he became president of Union Theological Seminary. He was director of the American School for Oriental Study and Research in Palestine (Jerusalem), 1907-08. Besides many pamphlets and magazine articles, he was the author of *Assyriology—Its Use and Abuse*, *The Teaching of the Twelve Apostles*, *The Christian Point of View*, and a *Hebrew Lexicon*.

Brown, **GEORGE**, a Canadian journalist and politician, born in Edinburgh, Scotland, in 1818, and educated at the high school there. He emigrated to the United States with his father, and assisted in the management of a newspaper at New York; but in 1843 removed to Toronto, Canada, where he founded a newspaper, *The Globe*, which was very successful. In 1852 he was returned to Parliament, and rapidly rose to the first rank as a debater and advocate of reforms. In 1858 he was called to the office of premier, and formed an administration, which, however, owing to an adverse vote of the assembly, lasted only three days. In 1864 he joined the coalition government as leader in the reform section, was called to the senate in 1873, and the year after went to Washington along with Sir Edward Thornton to negotiate a commercial treaty with the United States. He died on May 9, 1880, of a gunshot wound inflicted by a discharged employee. Mr. Brown, though

perhaps wanting in some of the qualities which make a successful parliamentary leader, was a great personal force in Canadian politics, and contributed powerfully to the cause of reform.

Brown, **SIR GEORGE**, a distinguished British general, born near Elgin in 1790; died in 1865; served in the Peninsular war, and in the American campaign of 1814. He became lieutenant-general in 1851; and distinguished himself in the Crimean war at Alma, Inkerman, and Sebastopol. Was made K.C.B. in 1855.

Brown, **JOHN**, a Scottish covenanting martyr, born about 1627; killed in 1685. He is said to have fought against the government at Bothwell Bridge in 1679, and to have been on intimate terms with the leaders of the persecuted party. He was shot by Claverhouse and a party of his dragoons at Priestfield or Priesthill in the upland parish of Muirkirk, Ayrshire, where he cultivated a small piece of ground and acted as a carrier.

Brown, **JOHN**, a Scottish divine, minister in Burgher dissenting body at Haddington, born in 1722; died in 1787. By latense application to study he became acquainted with the French, Italian, German, Arabic, Persian, Syriac, and Ethiopic languages, as well as the Greek and Hebrew. His most important works are: *The Self-interpreting Bible*; *Dictionary of the Bible*; *General History of the Church*; *Harmony of Scripture Prophecies*, etc.

Brown, **JOHN**, a Scottish divine, grandson of the preceding, born in 1784; died in 1858. He was ordained pastor of the Burgher congregation at Biggar in 1806. In 1821 he removed to Edinburgh; and in 1834 became professor of theology in connection with the body to which he belonged, afterwards merged in the United Presbyterian Church. He was author of numerous works chiefly in Biblical criticism, some of which were very popular.

Brown, **JOHN**, author of the Brunonian system in medicine, was born in Berwickshire in 1735; died at London in 1788. After studying medicine at the Edinburgh University he took the degree of Doctor in Medicine at St. Andrews, and after practising and teaching in Edinburgh he published his *Elements of Medicine* (in Latin). He maintained that the majority of diseases were proofs of weakness and not of excessive strength or excitement, and therefore contended that indiscriminate lowering of the system, as by bleeding, was erroneous, and that supporting treat-

Brown

ment was required. His system gave rise to much opposition, but his opinions materially influenced the practice of his professional successors. Having fallen into difficulties, he removed to London in 1786.

Brown, John, physician and essayist, son of the preceding, born at Biggar in 1810; died at Edinburgh in 1882. He graduated M.D. in 1833 and began practice as a physician. His leisure hours were devoted to literature, many of his contributions appearing in the *North British Review*, *Good Words*, and other periodicals. His collected writings were published under the title of *Hours Subsecivæ* (leisure hours), and embrace papers bearing on medicine, art, poetry, and human life generally. Several of his sketches (such as *Rab and his Friends*, *Our Dogs*, *Pet Marjory*, *Jeems the Doorkeeper*) on which his fame chiefly rests, have been published separately. Humor, tenderness, and pathos are his chief characteristics.

Brown, John, an opponent of slavery, born at Torrington, Connecticut in 1800. He early conceived a hatred for slavery, and having removed to Oswatomie, Kansas, in 1855, he took an active part against the proslavery party in the struggle for the possession of the territory that ensued. In the summer of 1859 he rented a farmhouse about six miles from Harper's Ferry, and organized a plot to liberate the slaves of Virginia. On October 16, with the aid of about twenty friends, he surprised and captured the arsenal at Harper's Ferry, but was wounded and taken prisoner by the Virginia militia next day, tried, and executed at Charlestown, December 2. This event was prominent among the warlike issues of the time, some of the antislavery party regarding John Brown as a martyr to their cause.

Brown (or BROWNE), ROBERT, founder of an English religious sect first called *Brownists*, and afterwards *Independents*, was born about 1540, and studied at Cambridge, where in 1580 he began openly to attack the government and liturgy of the Church of England as anti-Christian. After attacking the established church for years he was excommunicated, but was reinstated, and held a church living for over forty years, dying in 1633. The sect of Brownists, far from expiring with their founder, soon spread, and a bill was brought into parliament which inflicted on them very severe pains and penalties. In process of time, however, the name Brownists was merged in that of Congregationalists or Independents.

Brown, Robert, botanist, born at Montrose, Scotland, in September, 1778; died at London 10th January, 1858; was the son of a Scotch Episcopalian clergyman. He received his education at Marischal College, Aberdeen, afterwards studied medicine at Edinburgh. In 1800 he was appointed naturalist to Flinders' surveying expedition to Australia. He returned with nearly 4000 species of plants, and was subsequently appointed librarian to the Linnean Society. In 1810 he published the volume of his great work *Prodr. Floræ Novæ Hollandiæ et Insulæ Diemen*. No second volume of it appeared. He was the first English writer on botany who adopted the natural system of classification, which since entirely superseded that of Linnæus. In 1814 he published a botanical appendix to Flinders' account of his voyage, and in 1828 *A Brief Account of Microscopical Observations on the Pollen of Plants*, and on the *General Existence of Molecules in Organic and Inorganic Bodies*. He also wrote botanical notices for the voyages of Ross and the African exploration of Denham, Clapperton and others, and dealt with Dr. Bennet, the plants collected by Dr. Horsfield in Java. In 1810 he received the charge of the collection of Sir Joseph Banks. He transferred them in 1827 to the British Museum, and was appointed keeper of it in that institution. He became a member of the Royal Society in 1811, and of the French Academy of Sciences in 1832, a foreign associate of the French Academy of Sciences in 1833. He had the Copley medal in 1834. He was appointed president of the Linnean Society in 1849. As a naturalist he occupied the very highest rank among men of science. A collection of his miscellaneous writings has been published by the Ray Society (1866-67).

Brown, Thomas, poet and humorous writer, described by Addison as 'of facetious memory', was born at Shifnal, Shropshire, in 1663; died at London in 1704. He was the author of numerous dialogues, letters, poems, witty, coarse, and indelicate, collected in 1707.

Brown, Thomas, a Scotch mathematician, was born at Breck, Kirkcudbright, in 1778; died at Brompton, London, in 1820. He was educated at the High School, and subsequently at the University of Edinburgh, where he obtained the professorship of moral philosophy. He distinguished himself, at a very early age by

Brown

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review of the medical and physiological theories of Dr. Darwin, in a work entitled *Observations on Darwin's Zoonomia*. He published some indifferent poems which were collected in 1820. But he chiefly deserves notice on account of his metaphysical speculations, his chief work being *Lectures on the Philosophy of the Human Mind*, 1822. His system reduces the intellectual faculties to three great classes—perception, simple suggestion, and relative suggestion; employing the term suggestion as nearly synonymous with association. He held original views in regard to the part played by touch and the muscular sense in relation to belief in an external world. His development of the theory of cause and effect was first suggested by Hume.

Brown Bess, a name familiarly given to the old government regulation bronzed flint-lock musket formerly used in the British army.

Brown Bread. See *Bread*.

Brown Coal, a variety of Lignite (q. v.).

Browne (brown), CHARLES FARRAR, an American humorist, best known as 'Artemus Ward,' was born at Waterford, Maine, in 1834; died at Southampton, England, in 1867. Originally a printer, he became editor of papers in Ohio, where his humorous letters became very popular. He subsequently lectured on California and Utah in the States and in England, where he contributed to *Punch*. His writings consist of letters and papers by 'Artemus Ward,' a pretended exhibitor of wax figures and wild beasts, and are full of drollery and eccentricity.

Browne, HABLOT KNIGHT, an English designer of humorous and satirical subjects, and an etcher of considerable skill, better known by the pseudonym of 'Phiz,' born at Kennington, Surrey, 1815; died at Brighton 1882. In 1835 he succeeded Seymour as the illustrator of Dickens' *Pickwick*, and was afterwards engaged to illustrate *Nickolas Nickleby*, *Dombey and Son*, *Martha Chuzzlewit*, *David Copperfield*, and other works of that author. He also illustrated the novels of Lever, Ainsworth, et al., besides sending many comic sketches to the illustrated serials of the time.

Browne, ISAAC HAWKINS, an English poet, born at Burton-on-Trent in 1706; died in 1760. Author of *Design and Beauty*; *The Pipe of Tobacco* (in which he imitates Pope, Young, Swift, and others); and a Latin Poem,

De Animi Immortalitate, modeled on Lucretius and Virgil.

Browne, SIR THOMAS, an English physician and writer, was born at London in 1606; died at Norwich in 1682. He was educated at Winchester School and Oxford, where he took the degree of M.A. He practised as a physician for some time in Oxfordshire. He subsequently visited the continent of Europe and received the degree of M.D. at Leyden. On his return to England he settled as a physician at Norwich, where he married and acquired an extensive practice and high reputation. In 1642 was published his *Religio Medici* ('A Physician's Religion'), which excited the attention of the learned, not only in England but throughout Europe, gave rise to doubts of the author's orthodoxy, and was translated into various languages. In 1648 his literary reputation was still further heightened by the appearance of his *Pseudodoxia Epidemica*, or *Treatise on Vulgar Errors*, a work of extraordinary learning, and accounted the most solid and useful of his literary labors. In 1658 his *Hydriotaphia*, or *Treatise on Urr-Burial*, appeared jointly with his *Garden of Cyrus*, a work treating of horticulture from Adam's time to that of Cyrus. These works ranked him very high as an antiquary; and he maintained a wide correspondence with the learned both at home and abroad. In 1665 he was constituted an honorary member of the College of Physicians, and in 1671 Charles II, visiting Norwich, conferred on him the honor of knighthood. Of a most amiable private character, he was happy in the affection of his large family and numerous friends; and passed through a remarkably tranquil and prosperous literary and professional life. Though he wrote exposing vulgar errors, he was himself a believer in alchemy, astrology, and witchcraft.

Browne, WILLIAM, an English poet, born at Tavistock, Devonshire, in 1591; died about 1645. In his twenty-third year he published his *Britannia's Pastorals*, which met with great approbation; and in the following year appeared his *Shepherd's Pipe*, in seven eclogues. In 1616 he published the second part of his *Britannia's Pastorals*, which met with equal success with the former. Browne was tutor to Robert Dormer, earl of Caernarvon, who was killed at the battle of Newbury, and filled a similar office in the family of the Earl of Pembroke.

Browne, WILLIAM G., an English traveler in Africa and Asia;

Browne

born at London in 1768; killed by robbers in Persia in 1813. He visited the African kingdoms of Darfur and Bornou in 1791, and was the first who made those countries known to Europeans. He published in 1799 *Travels in Africa, Egypt, and Assyria, from 1792 to 1798*.

Brown Holland, an unbleached linen used for various articles of clothing and upholstery.

Brownie (brou'ni), in Scotland, an imaginary spirit formerly believed to haunt houses, particularly farmhouses. Instead of doing any injury he was believed to be very useful to the family, particularly to the servants if they treated him well, for whom he was wont to do many pieces of drudgery while they slept. The brownie bears a close resemblance to the Robin Goodfellow of England, and the *Kobold* of Germany.

Brown'ian MOVEMENTS, the incessant activity manifested by small solid particles suspended in water, when observed under the microscope. This phenomenon was first observed by Robert Brown, the botanist (q. v.). Its cause is unknown. It is a vibratory movement, different from the movement of translation shown by organic germs.

Browning (broun'ing), ELIZABETH BARRETT, poetess; born at Durham, England, in 1806; died at Florence, June 30, 1861. Her father, Edward Moulton, took the name of Barrett on succeeding to some property. She grew up at Hope End, near Ledbury, Herefordshire, where her father possessed a large estate. Her bodily frame was from the first extremely delicate, and she had been injured by a fall from her pony when a girl, but her mind was sound and vigorous, and disciplined by a course of severe and exalted study. She early began to commit her thoughts to writing, and in 1826 a volume, entitled *An Essay on Mind, with other Poems*, appeared of her authorship. A money catastrophe compelled her father to settle in London, and her continued delicacy received a severe shock by the accidental drowning of her brother, causing her to pass years in the confinement of a sickroom. Her health was at length partially restored, and in 1846 she was married to Mr. Robert Browning, soon after which they settled in Italy, and continued to reside for the most part in the city of Florence. Her *Prometheus Bound* (from the Greek of Æschylus) and *Miscellaneous Poems* appeared in 1833; the *Seraphim* and

other Poems in 1838. In 1856 a collected edition of Mrs. Browning's works appeared, including several new poems, among these *Lady Geraldine's Courtship*, *Casa Guidi Windows*, a poem on the struggles of the Italians for liberty 1848-49, appeared in 1851. The long and most finished of all her works, *Aurora Leigh*, a narrative and didactic poem in nine books, was published in 1857. *Poems before Congress*, appeared in 1860, and two posthumous volumes, *Last Poems*, 1862, and *The Greek Christian Poems and the English Poems* (prose essays and translations), 1863, were edited by her husband.

Browning, ROBERT, poet, born Camberwell, Surrey, 1812; died Dec. 12, 1889. He was educated at University College, London, after which he went to Italy, where he made diligent study of its medical history and the life of the people. In 1846 he married Elizabeth Barrett (above), and afterwards resided chiefly in Italy, making occasional visits to England. His first poem, *Pauline*, was published in 1833; followed by *Paracelsus* (1835); *Stafford, a Tragedy* (1837), produced at Covent Garden, Macready and Helen Faucit playing the chief parts. *Sordello* appeared in 1840, followed by the series called *Bells and Pomegranates*, including the three plays *Pippa Passes*, *King Victor and King Charles*, *Colombe's Birthday*; four tragedies: *Return of the Druses*, *A Blot on the Scutcheon*, *Luria*, and *The Soul's Tragedy*; and a number of *Dramatic Lyrics*, among them the well-known *Pied Piper of Hamelin*, and *How they Brought the Good News from Ghent to Aix* (1846). Between 1846 and 1868 appeared *Men and Women*; *Christmas Eve and Easter Day*; *Dramatis Personæ*, some shorter poems. *The Ring and the Book* (1869), his longest poem, followed by *Balaustion's Adventure*, *Prince Hohenstiel-Schwangau* (1871), *Fifine at the Fair* (1872); *Red Rocket*, *Nightcap Country* (1873); *Aristophranes*, *Apology*; *Inn Album* (1875); *Porphyrio* (1876); *La Saisiaz* (1878); *Idylls* (1879-80); *Julian* (1883); *Perishtah's Fancies* (1884); and *Parleyings with certain Persons of Importance in their Day* (1885). Browning received the degree of Doctor of Letters from Oxford in 1882. Brownings have been formed in England and the United States for the study of his works, his poems being often difficult to understand from the quick transition of thought, and not infrequently ruggedly harsh in expression. Yet the

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Brownists, the name given for some time to those who were afterwards known as Independents, so called from Robert Brown.

Brownlow (broun'lō), WILLIAM GANNAWAY, born in Virginia in 1805; died in 1877; was for ten years an itinerant Methodist preacher. As editor of the *Knoxville Whig* his bold and quaint utterances gave him a wide reputation. In the secession he clung to the Union, was arrested by the Confederate government and sent out of their lines. In 1865 he was elected governor of Tennessee, and in 1869 United States senator. He was an ardent, fearless advocate of any cause he espoused.

Brownspar, a name often given by mineralogists to certain varieties of dolomite, from their brownish color. They are also sometimes called *pearlspar*, from their pearly luster.

Brownsville (brounsvil), a city, county seat of Cameron Co., Texas; the metropolis and commercial center of the Rio Grande Valley, and a gateway to Mexico. It has a large sugar industry, cotton-seed oil mill, etc. Pop. 10,517.

Brown University, an educational institution at Providence, Rhode Island, founded 1764. It has a valuable library of 170,000 vols., a teaching faculty of about 100, and 1000 students. Its productive funds amount to \$3,500,000. Johann Nicholas Brown, merchant of Rhode Island, largely endowed it, and its name in consequence was changed from Rhode Island College to its present title.

Bruce (brūs), a family name distinguished in the history of Scotland. See the articles below.

Bruce, DAVID. See *David II*.

Bruce, EDWARD, a brother of Robert I, who, after distinguishing himself in the war of independence, crossed in 1315 to Ireland to aid the native septs against the English. After many successes he was crowned king of Ireland at Carrickfergus, but fell in battle near Dundalk in 1318.

Bruce, JAMES, an African traveler, born at Kinnaird House, Stirlingshire, Scotland, in 1730. He received his education at Harrow and at the University of Edinburgh, and entered the wine trade, but having inherited his father's estate in 1758 he soon gave up business. From 1763 to 1765 he held the consulship of Algiers, and in 1765 he visited successively Tunis, Tripoli,

Rhodes, Cyprus, Syria, and several parts of Asia Minor, where he made drawings of the ruins of Palmyra, Baalbec, etc.

In 1768 he set out for Cairo, navigated the Nile to Syene, crossed the desert to the Red Sea, passed some months in Arabia Felix, and reached Gondar, the capital of Abyssinia, in 1770. In that country he ingratiated himself with the sovereign and other influential persons, and in the same year succeeded in reaching the sources of the Abai, then considered the main stream of the Nile. On his return to Gondar he found the country engaged in a civil war, and more than three years elapsed before he was able to return to Cairo. After visiting France and Italy he returned to Scotland in 1774. His long-expected *Travels* did not appear until 1790, and were received with some incredulity, though succeeding travelers have proved them in large part accurate. Bruce lost his life by an accidental fall down stairs in 1794.

Bruce, MICHAEL, a Scottish poet, born at Kinnesswood, Kinross-shire, in 1746. At first a herd-boy, he succeeded in attending Edinburgh University, occupying himself in the intervals as a village schoolmaster. The struggle against poverty brought on consumption, and he died in 1767. His poems, of which the best known is the *Elegy* on his own approaching death, were published by the Rev. John Logan in 1770. This volume contained a well-known ode to the cuckoo which Logan afterwards claimed as his own, though he really seems only to have somewhat improved Bruce's poem.

Bruce, ROBERT (ROBERT DE BRUS), fifth Lord of Annandale, born 1210; died at Lochmaben Castle (295). He was possessed of extensive estates in Cumberland, of which he was made sheriff in 1255. He was one of the fifteen regents of Scotland during the minority of Alexander III, and was one of the competitors for the Scottish crown on the death of Margaret, the Maiden of Norway, in 1290; Bruce being the grandson of David, Earl of Huntingdon, by his second daughter Isobel, while Baliol claimed as the great-grandson of the eldest daughter Margaret. On the decision of Edward being given in 1292 in favor of Baliol, Bruce resigned the estate of Annandale to his eldest son to avoid doing homage to his rival.

Bruce, ROBERT, Earl of Carrick, eldest son of the preceding, accompanied Edward I to Palestine in 1269; married, in 1271, Martha Margaret, Countess of Carrick. Like his father, he resigned the lordship of Ar-

Bruce

nandale to his eldest son to avoid acknowledging the supremacy of Balliol. On the revolt of the latter Bruce fought on the English side, and after the battle of Dunbar made an unsuccessful application to Edward for the crown. He died in 1304.

Bruce, ROBERT, the greatest of the kings of Scotland, was born in 1274, the son of the preceding. In 1296, as Earl of Carrick, he swore fealty to Edward I, and in 1297 fought on the English side against Wallace. He then joined the Scottish army, but in the same year returned to his allegiance to Edward until 1298, when he again joined the national party, and became in 1299 one of the four regents of the kingdom. In the three final campaigns, however, he resumed his fidelity to Edward, and resided for some time at his court; but, learning that the king meditated putting him to death on information given by the traitor Comyn, he fled in Feb., 1306, to Scotland, stabbed Comyn in a quarrel at Dumfries, assembled his vassals at Lochmaben Castle, and claimed the crown, which he received at Scone, March 27. Being twice defeated, he dismissed his troops, retired to Rathlin Island, and was supposed to be dead, when, in the spring of 1307, he landed on the Carrick coast, defeated the Earl of Pembroke at Loudon Hill, and in two years had wrested nearly the whole country from the English. He then in successive years advanced into England, laying waste the country; and on June 24, 1314, defeated in a famous battle at Bannockburn the English forces advancing under Edward II to the relief of the garrison at Stirling. In 1316 he went to Ireland to the aid of his brother Edward, and on his return in 1318, in retaliation for inroads made during his absence, he took Berwick and harried Northumberland and Yorkshire. Hostilities continued until the defeat of Edward near Byland Abbey in 1323, and though in that year a truce was concluded for thirteen years, it was speedily broken. Not until March 4, 1328, was the treaty concluded by which the independence of Scotland was fully recognized. Bruce did not long survive the completion of his work, dying at Cardross Castle on June 7, 1329. He was twice married; first to a daughter of the Earl of Mar, Isabella, by whom he had a daughter, Marjory, mother of Robert II; and then to a daughter of Aymer de Burgh, Earl of Ulster, Elizabeth, by whom he had a son, David, who succeeded him.

Bruchsal

(bruh'zäl), a town of Baden, 25 miles s. of

Heidelberg. It was the residence of the prince-bishops of Spire from the 11th century, but lost its importance until it became a considerable railway center. The Grand-duke of Baden has a fine palace here. Pop. 13,567.

Brucine (brö'sin or brö'sin), an alkaloid accompanying strychnine in nux vomica. Its taste is exceedingly bitter and acrid, and its action on the animal economy is entirely analogous to that of strychnine, but much less powerful.

Brueys-d'Aigalliers (brd-a-dä-gä-yä), FRANCE. COIS-PAUL, a French admiral, born Uzes 1753, became captain in 1792, a vice-admiral in 1798. He successfully conveyed Bonaparte and his army to Egypt in 1798, but was killed in the subsequent naval battle in the Bay of Aboukir shortly before his ship, the *Cent*, blew up.

Bruges (brüz; Flemish *Brugge*, *is*, Bridges), an old walled city of Belgium, capital of West Flanders, 57 miles n.w. of Brussels, on a railway to Ostend. It is an important canal center, and has over fifty bridges all opening in the middle for the passage of vessels. The principal canals are those to Sluis, Ghent, and Ostend, one of which fairly large vessels can come up to Bruges. In the 13th and 14th centuries it was one of the chief commercial places in Europe, and an important member of the Hanseatic League. Towards the end of the 15th century it began to decline, but still carries a considerable trade with the north of Europe, and is by its canals an entrepot of Belgian commerce. Among its noteworthy buildings are the Halles, containing cloth and other halls or markets; a fine old building, with a tower 350 feet high, in which is a numerous series of chimneys; the Hotel de Ville, the City Hall, and the Palace of Justice; the Church of Notre Dame, with its elevated and splendid tombs of Charles the Bold and Mary of Burgundy; etc. The city possesses interesting works of art by Van Eyck, Memling, the Van Orley, etc. Textile goods, lace, etc., are manufactured. Pop. 53,728.

Brugsch (brugsch), HEINRICH, a German Egyptologist, born in 1827. He early devoted himself to the study of Egyptian antiquities, resided a number of years in Egypt, being for some time in the employ of the Egyptian government, by which he was created a bey, and latterly a pasha. Brugsch also traveled in various parts of the East. His works are very

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ous. His *History of Egypt from the Monuments*, has been translated into English. Died 1894.

Brühl (brül), HEINRICH, COUNT VON, minister and favorite of Augustus III, King of Poland, born in 1700; died 1763. In 1747 he became the prime-minister of Augustus, to gratify whose wishes he exhausted the state, plunged the country into debt, and greatly reduced the army. He acquired great wealth and lived in greater state than the king himself. His profusion was often beneficial to the arts and sciences, and his library of 62,000 vols. forms a chief part of the Royal Library at Dresden.

Brumaire (brü-mär; L. *bruma*, winter), the second month in the calendar adopted by the first French republic, beginning on the 23d of October and ending 21st November. The 18th Brumaire of the year VIII of the French Revolution (Nov. 9, 1799) witnessed the overthrow of the Directory by Bonaparte.

Brumbaugh (brum'ba), MARTIN GROVE, American educator and statesman, born April 14, 1862 in Huntingdon County, Pennsylvania. He was educated at Juniata College; took a master's degree at the University of Pennsylvania in 1894 and a doctor's degree in 1895. He was county superintendent of schools in Huntingdon County, president of Juniata College, professor of pedagogy in the University of Pennsylvania, and 1906-1914, superintendent of schools in Philadelphia. In 1914 he was elected governor of Pennsylvania on the Republican ticket.

Brummell (brum'mel), GEORGE BRYAN (*Beau Brummell*), son of a clerk in the Treasury, born in London in 1778. He was educated at Eton and at Oxford, and at the age of sixteen made the acquaintance of the Prince of Wales, afterwards George IV, who gave him a commission in his own regiment. He left the service in 1798 and inherited a fortune of £30,000, which he expended in a course of sumptuous living, during which his *dicta* on matters of etiquette and dress were received in the *beau monde* as indisputable. His creditors at length became clamorous, and in 1816 he took refuge in Calais. Subsequently (1830) he was appointed consul at Caen, but on the abolition of the post was reduced to poverty, and died in a lunatic asylum in 1840.

Brunanburgh (brun'a-burg), the scene of a battle in which Athelstan and the Anglo-Saxons defeated a force of Scots, Danes, etc., in 937; locality very doubtful.

Brunel

Brunck (brunk) RICHARD FRANÇOIS PHILIPPE, a classical commentator, born at Strasburg in 1729; died there in 1803. He published valuable editions of Virgil, Apollonius Rhodius, Aristophanes, the Gnomic poets, Plautus, Terence, and Sophocles.

Brune (brün), GUILLAUME MARIE ANNE, marshal of France, son of a lawyer at Brives-la-Gaillarde, born in 1763. In 1793 he joined the army; in 1799 he compelled the British and Russians to evacuate the north of Holland. In 1800 he pacified La Vendée. In 1802-4 he was ambassador at Constantinople, and the latter year was made a marshal. Losing the favor of Napoleon, he remained without employment for some years, but on the return of Napoleon from Elba he received command, which he was soon after compelled to surrender at the second restoration. He then set out for Paris, but was attacked and brutally killed by the populace at Avignon.

Bruneau (brü'no) ALFRED, French musical composer, born 1857. He is best known by his productions in the field of musical drama. In 1891 appeared his opera *Le Réve*, with its libretto founded on Zola's novel. Zola himself wrote the libretti for the operas *Messidor* (1897) and *L'Ouragan* (1901).

Bruneilda (brün-hil'da), a Visigothic princess, married to Siegebert I, King of Austrasia, in 568. To avenge her sister (assassinated at the instigation of Fredegonde) she involved her husband in a war with his brother Chilperic, in the course of which Siegebert was murdered, A.D. 575, and she herself taken prisoner. She induced Meroveus, one of Chilperic's sons, to marry her, effected her escape, recovered her authority and maintained it till 613, when she was captured by Fredegonde's son, Clothaire II, of Soissons, who had her torn to pieces by wild horses.

Brunel (brö'ni), a native state on the west coast of the island of Borneo. In 1906 it became a British protectorate. Area, 8100 square miles; population 25,000.—BRUNEL, the chief town and residence of the Sultan, is built entirely over the water; population 10,000. Some coal is mined, the Rajah of Sarawak having a monopoly of coal mining. Crutch and other jungle products are exported. A British resident supervises the general administration. A loan of \$200,000, made by the Federated Malay States in 1906, was used partly for buying out some of the monopolists who had obtained the right to collect the revenues.

Brunel (brö'nel'), ISAMBARO KINGDOM, an English engineer, son of Sir Mark Isambard Brunel, born in 1806; died in 1859. He was educated

Brunel

at the Henri IV College, Paris; and commenced practical engineering under his father, acting at twenty as resident engineer at the Thames Tunnel. Among his best-known works were the *Great Western, Great Britain, and Great Eastern* steamships; the entire works on the Great Western Railway, to which he was appointed engineer in 1833, the Hungerford suspension bridge, docks at Plymouth, Milford Haven, etc.

Brunel, SIR MARK ISAMBARD, a distinguished engineer, was the son of a Normandy farmer, and born near Rouen in 1769. He was educated in Rouen, his mechanical genius early displaying itself. In 1786 he entered the French naval service, and in 1793 only escaped proscription by a hasty flight to America, where he joined a French expedition to explore the regions around Lake Ontario. He was afterwards employed as engineer and architect in the city of New York, erecting forts for its defense, and establishing an arsenal and foundry. In 1799 he proceeded to England and settled at Plymouth, quickly gaining reputation by the invention of an important machine for making the block-pulleys for the rigging of ships. Among his other inventions were a machine for making seamless shoes, machines for making nails and wooden boxes, for ruling paper and twisting cotton into hanks, and a machine for producing locomotion by means of carbonic acid gas; but his greatest engineering triumph was the Thames tunnel, commenced March, 1825, and opened in 1843. In 1841 the honor of knighthood was conferred on him. He died in Dec., 1849.

Brunelleschi (brü-nel-es'kë), FILIPPO, an Italian architect, born in 1377 at Florence. He won some reputation as an inventor and sculptor, and made special studies in the then little known science of perspective, but devoted himself particularly to architecture. When at Rome with Donatello he conceived the idea of bringing architecture back to Græco-Roman principles as opposed to the dominant Gothic. In this he was successful, his work opening the way for Alberti, Bramante, Vignola, and Palladio. His great achievement was the dome of the cathedral of Santa Maria at Florence, the possibility of which was denied by other architects. It has remained unsurpassed, the dome of St. Peter's, though it excels in height, being inferior to it in massiveness of effect. Other important works by him were the Pitti Palace at Florence, the churches of San Lorenzo and

Spirito Santo, and the Capella del Pazzi. Died in 1446.

Brunet (brü-nä), JACQUES CHARLES, a French bibliographer and bookseller at Paris, born 1780; died 1867. He began his bibliographical career by the preparation of several auction catalogues, and of a supplementary volume to the *Dictionnaire Bibliographique* of Cailleau and Duclos (Paris, 1802). In 1810 was published the first edition of his valuable *Manuel du Libraire*, which has gone through many editions and extensions, and is still perhaps the best book of its class.

Bruni. See *Brunel*.

Bruni, LEONARDO. See *Bruno*.

Brunings (brü'ningz), CHRISTIAN, a great hydraulic architect of Holland, born in 1736; appointed general inspector of rivers by the State of Holland in 1769; died in 1805.

Brünn (brün), an Austrian city, capital of Moravia, on the river Morava, way from Vienna to Prague, nearly enclosed by the rivers Schwarza and Zlawa. It contains a cathedral and other handsome churches; a landhaus, where the provincial assembly meets, and several palaces; and has extensive manufactures of woollens, which have procured for the name of the Austrian Leeds. It is the center of Moravian commerce, a great part of which is carried on by freight. Near it is the fortress of Spielberg, which Trenck and Silvio Pellico were confined. Pop. 125,137.

Bruno, GIORDANO (jor-dü'nö brö), an Italian philosopher of the Renaissance, born at Nola about 1570. He entered the order of Dominicans, was accused of impiety, and, after being during much persecution, fled from Italy about 1577 to Geneva. Here he was soon persecuted in turn by the Calvinists and traveled slowly through southern France to Paris, where he was offered a chair of philosophy, but declined to fill its conditions of attendance at the Sorbonne. He lectured for some time, however, in opposition to the antiquated Aristotelianism of the time and in exposition of a logical system based on the *Ars Magna* of Raymond Lully. In 1583 he was banished from Paris, and fled to London, where he published several of his works, and to Oxford, where he taught for a short time. In 1585 he fled by way of Paris and Marburg to Wittenberg, and from 1586 to 1588 taught philosophy there. He next went to Prague and to Helmstedt, where he remained till 1589; thence to Frankfurt until 1592; and finally to Padua.

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to Frankfurt
Padua, where

he remained until the inquisition of Venice arrested him and transferred him to Rome. After an imprisonment of seven years, during which he steadfastly refused to retract his doctrines, he was burned, February 16, 1600, for apostasy, heresy, immorality, and violation of vows. Most of his works were published between 1584 and 1591, the chief being the *Cena de la Ceneri* ('Ash-Wednesday Table-talk,' dialogues giving an exposition of the Copernican theory); the *Spaccio della Bestia Trionfante* ('Expulsion of the Triumphant Beast,' a moral allegory); the *Della Causa, Principio ed Uno*; and the *Dell' Infinito, Universo, e Mondi*—all in 1584; the *Cabala del Cavallo Pegaseo* in 1585; and the three metaphysical works, *De Triplici Minimo et Mensura*; *De Monade, Numero et Figura*; and *De Immenso et Innumeralibus*—all in 1591. His doctrines form a more complete Pantheistical system than had been previously exhibited, and represent the most advanced stage of the thought of the period.

Bruno (brō'nō), or BRUNI (BRUNUS), LEONARDO, an Italian scholar, born in 1370 at Arezzo, whence his name *Aretino*. He was secretary to the papal chancery under Innocent VII, Gregory XII, Alexander V, and John XXIII. On the deposition of the latter he escaped to Florence, where he wrote his history of Florence, received in consequence the rights of citizenship, and afterwards, by the favor of the Medici, became secretary to the republic till his death in 1444. He did much to advance the study of Greek literature by his literal Latin translations from Aristotle, Demosthenes, Plutarch, etc., and was the author of biographies of Dante and Petrarca.

Bruno, St.—1. The Benedictine apostle of Prussia who accompanied St. Adalbert to Prussia, was appointed chaplain to the Emperor Henry II, and who, having been taken by the Pagans of Lithuania, had his hand and feet cut off, and was beheaded in 1008. 2. The founder of the order of Carthusian monks, born at Cologne about 1030 of an old and noble family; appointed by Bishop Gervais superintendent of all the schools of the Rheims district, whither he attracted many distinguished scholars, among others Odo, afterwards Pope Urban II. Subsequently he was offered the bishopric of Rheims, but, declining it, repaired with six friends to Hugo, Bishop of Grenoble, who, in 1084 or 1086, led them to the Chartreuse, the spot from which the order of monks received its name. Here, in a bleak and

narrow valley, Bruno and his companions built an oratory, and small separate cells for residence. In 1089 he reluctantly accepted the invitation of Urban II to Rome, but refused every spiritual dignity, and in 1094 founded a second Carthusian establishment in Della Torre, Calabria. Here he died in 1101. He was beatified by Leo X and canonized by Gregory XV.

Bruno The Great, Archbishop of Cologne and Duke of Lorraine, third son of Henry the Fowler, and brother of the Emperor Otho I. He was employed in various important negotiations, and was a great patron of learning. Commentaries on the *Pentateuch*, and some biographies of saints, are ascribed to him. He died in 965, at Rheims.

Brunonian Theory (in medicine). See *Brown, John*.

Brunswick (bruns'wik; German name, *Braunschweig*), a duchy and sovereign state in the north-west of Germany, area 1425 sq. m. It is divided into several detached portions, surrounded by the Prussian provinces of Hanover, Saxony, and Westphalia. A good portion of it is hilly or undulating, and it partly belongs to the Harz mountain system. Mining is carried on chiefly in the Harz, and the minerals include iron, lead, copper, brown coal, etc. About half the surface is arable, and the chief cultivated products are grain, flax, hops, tobacco, potatoes, and fruit. Brewing, distilling, the manufacture of linens, woollens, and leather, the preparation of paper, soap, tobacco, beet-sugar, with agriculture and mining, afford the principal employment of the people. As a state of the German Empire it sends two members to the Bundesrath, and three deputies to the Reichstag. In its internal government it is a constitutional monarchy. On the death of the Duke of Brunswick without issue in 1884 the Duke of Cumberland claimed the succession. Bismarck, however, interfered, and the Brunswick diet decided to place the duchy under a regent, Prince Albrecht of Prussia being elected to the post. Pop. 494,339, mostly Lutherans by religion. (See *Brunswick, Family of*.) —BRUNSWICK, the capital, is situated on the Oker, and on the railway from Hanover to Berlin. The older streets are narrow, tortuous, and antiquated. The principal buildings of note are the ducal palace, the cathedral of St. Blaise (1173), St. Catherine's Church (dating from 1172), and St. Magnus' (1031), the Gewandhaus, and the fine old Gothic

Brunswick

Council House. The educational institutions include the polytechnic school, a gymnasium, etc., and there are a city museum, a ducal museum, and a public library. The principal manufactures are wool, linen, jute, machinery, sewing-machines, etc. Pop. (1910) 143,319.

Brunswick, a city of Georgia, county seat of Glynn county, on St. Simon's Sound, 80 miles s. s. w. of Savannah. It has a very large shipping trade in cotton, lumber, phosphates and naval stores, contains a large turpentine and rosin plant, and is a popular winter resort. Pop. 10,182.

Brunswick, a town of Maine, on the Androscoggin, 9 miles w. of Bath. At Bowdoin College, in this town, Hawthorne and Longfellow graduated in 1825, and the latter filled the chair of modern languages for several years. It has cotton and paper mills and other industries. Pop. 6621.

Brunswick, FAMILY OF, a distinguished family founded by Albert Azo II, Marquis of Reggio and Modena, a descendant, by the female line, of Charlemagne. In 1047 he married Cunigunda, heiress of the Counts of Altorf, thus uniting the two houses of Este and Guelph. From his son, Guelph, who was created Duke of Bavaria in 1071, and married Judith of Flanders, a descendant of Alfred of England, descended Henry the Proud, who succeeded in 1125, and by marriage acquired Brunswick and Saxony. Otho, the great-grandson of Henry by a younger branch of his family, was the first who bore the title of Duke of Brunswick (1235). By the two sons of Ernest of Zell, who became duke in 1532, the family was divided into the two branches of Brunswick-Wolfenbüttel (II) and Brunswick-Hanover, from the latter of which comes the present royal family of Britain. The former was the German family in possession of the duchy of Brunswick until the death of the last duke in 1884. George Louis, son of Ernest Augustus and Sophia, granddaughter of James I of England, succeeded his father as Elector of Hanover in 1698, and was called to the throne of Great Britain in 1714 as George I.

Brunswick, FERDINAND, DUKE OF, fourth son of Duke Ferdinand Albert, was born at Brunswick 1721. In 1739 he entered the Prussian service, was engaged in the Silesian wars, and in the Seven Years' war commanded the allied army in Westphalia. He drove the French from Lower Saxony, Hesse, and Westphalia, and was victorious at Crefeld and Minden. After

the peace he retired to Brunswick, and died in 1792.

Brunswick, FRIEDRICH WILHELM, DUKE OF, fourth and youngest son of Duke Karl Wilhelm Ferdinand of Brunswick; born in 1747. During the war against France, in 1792 and subsequently, he fought in the Prussian armies, was twice wounded, once made prisoner with Blücher at Lubeck. For the campaign of 1809 raised a free corps in Bohemia, but compelled to embark his troops for England, where he was received with enthusiasm. His corps immediately entered the British service, and was afterwards employed in Portugal and Spain, the parliament granting him a pension of £10,000 until he returned to his hereditary dominions, 1813. The events of 1815 called him again to arms, and he fought at Quatre Bras, 1815. Caroline, wife of George IV, was a sister of this prince.

Brunswick, KARL WILHELM, DUKE OF, born in 1735; entered upon the government in 1780. He received the chief command of the Austrian and Prussian armies against France in 1792, and designed to press forward from Lorraine to the Rhine, but, after taking Longwy and Verdun, was baffled in Champagne by Dumouriez, defeated at Valmy by Kellerman, and obliged to evacuate the province. In 1793 the duke, in conjunction with the Austrians, opened the campaign on the upper Rhine, took Königstein and Landau, and prepared to attack Landau. A long struggle with varying success followed, Austrian lines were broken by Picton, and the duke was obliged to follow in retreat across the Rhine. At Alton he was mortally wounded in 1806.

Brunswick Black, a varnish composed of lampblack and turpentine, and used to cast-iron goods. Asphalt and turpentine are also ingredients in some kinds of it.

Brunswick Green, commonly known as bonate green, is prepared by per mixed with chalk or lime.

Brusa, BROUSSA (br'ō'sā), or BRUSA, a Turkish city in Asia Minor, south of the Sea of Marmora, 100 miles distant from its port, with a pop. of about 110,000. It is inhabited by Greeks, Armenians, and Jews, and is famous in commerce, and the manufacture of satins, silk stuffs, carpets, gauzes, and meerschaum, obtained in the vicinity. It is situated in a fertile plain, which is closed by the ridges of Olympus, and abounds in hot springs. Brusa

Brusa

swick, and

WILHELM, fourth and son of Wilhelm I, born in 1771. He was in the Prussian army, and was killed at the battle of Eylau in 1807. He was the father of the Prussian king, Frederick William III.

WILHELM FERDINAND, Duke of Brunswick, born in 1783. He was the son of the Duke of Brunswick, and was killed at the battle of Waterloo in 1815. He was the father of the Duke of Brunswick, and was killed at the battle of Waterloo in 1815.

varnish composed chiefly of oil, and applied with a brush, and oil of turpentine in some

commonly a carbonate of copper.

BRUSA, or **BURSA**, a city in Asia Minor, in the province of Bithynia, about 20 miles from the port of Mudania. It has a population of 110,000. It is famous for its silk, and for its manufacture of carpets, gauze, etc. The town is situated in a fertile plain, which is watered by the river of Olympus, and is surrounded by mountains.

Brush

sents the ancient Prusa, long capital of Bithynia, and one of the most flourishing towns in the Greek Empire of Constantinople. It was the residence of the Turkish sovereigns from 1329 until the transference of the seat of empire to Adrianople in 1365.

Brush, a well-known implement used for various purposes. There are two chief varieties, those with stiff hair or fibers and those with flexible. The former are made of hog's bristles, whalebone fibers, vegetable fibers of various kinds (brush-grass, palms, etc.), and sometimes wire is made to serve the same purpose. The latter are made of hog's bristles or of the hair of the camel, badger, squirrel, sable, goat, etc., and are chiefly used for painting, the smallest kinds, made round, being called *pencils*.

Brush, **CHARLES FRANCIS**, electrician, born at Euclid, Ohio, in 1849. He took part in the invention of the dynamo and invented the Brush arc-lamp. In 1881 he was made a chevalier on the French Legion of Honor.

Brush-grass (*Andropogon gryllus*), a grass of South Europe, with stiff, wiry roots, which are used for making brushes.

Brush-turkey. See *Tallegalla*.

Brush-wheel, a toothless wheel sometimes used in light machinery to turn a similar wheel by means of bristles or some brushlike or soft substance, as cloth, buff-leather, India rubber, or the like.

Brussa. See *Brusa*.

Brussels (brus'elz; Flemish, *Brussel*; French, *Bruzelles*), the capital of Belgium and of the province of Brabant, is situated on the small river Senne, which is not navigable, but serves as a canal-feeder. The city consists of a northwestern or lower portion and a southeastern or upper portion. The older part is surrounded with fine boulevards on the site of its fortifications, and in many places presents a congeries of twisted streets. The upper town, which is partly inside the boulevards and partly outside, is the finest part of the city, and contains the king's palace, the palace of the chambers, the palace of justice (a magnificent new building of colossal proportions in the classical style, ranking among the finest in Europe), the palace of the fine arts, the public library and museum, etc.; and has also a fine park of 17 acres, around which most of the principal buildings are situated. The lower town retains much of its ancient appearance. The *Hôtel de Ville* (1401-55) is

Brussels

an imposing Gothic structure, with a spire 364 ft. in height, the square in front of it being perhaps the most pictorial of all the public places of Brussels. The Cathedral of Saint Gudule (dating in part from the 13th century) is the finest of many fine churches, richly adorned with sculptures and paintings. The whole town is rich in monuments and works of art. The institutions comprise a university, an academy of science and the



Town Hall, Brussels.

fine arts and polytechnic school; one of the finest observatories in Europe, a conservatorium of music; a public library, containing more than 450,000 volumes and 30,000 MSS.; a picture-gallery, with the finest specimens of Flemish art; and many learned societies and educational organizations. The manufactures and trade are greatly promoted by canal communications with Charleroi, Mechlin, Antwerp, and the ocean, and by the net-

work of Belgian railways. The industries are varied and important. Lace was an ancient manufacture, and is still of great importance; the manufacture of cotton and woolen fabrics, paper, carriages, and many minor manufactures are carried on. There are breweries, distilleries, sugar-refineries, foundries, etc. The language spoken by the upper classes is French, and Flemish is that of the lower; but German, Dutch, and English are also a good deal spoken.—During the middle ages Brussels did not attain great importance. It was walled by Baldric of Louvain in 1044; was more completely fortified in 1380; and was twice burned and once ravaged by the plague during the 15th century. It was bombarded and burned by the French in 1695; and was again taken by the French in 1794, and retained till 1814, when it became the chief town of the department of the Dyle. From 1815 to 1830 it was one of the capitals of the Kingdom of the Netherlands, and in 1830 was the chief center of the revolt which separated Belgium from Holland. It fell into German hands during the European war following the gallant but unsuccessful attempt of the Belgians to hold back the Teuton forces at Liège (q. v.). Brussels was occupied August 20, 1914, without resistance. The population of the capital before the war was 663,600. The Germans laid a huge indemnity upon the city and undertook a system of deportation that shocked the whole world.

Brussels Carpet. See *Carpet*.

Brussels Sprouts, one of the cultivated varieties of cabbage (*Brassica oleracea*), having an elongated stem 4 or 5 feet high, with small clustering green heads like miniature cabbages. They are cultivated in great quantities near Brussels.

Brutus, DECIMUS JUNIUS, served under afterwards Julius Cæsar in Gaul, and was like his relative, Marcus Junius Brutus, joined in the assassination of Cæsar. He was afterwards for a short time successful in opposing Antony, but was deserted by his soldiers in Gaul and betrayed into the hands of his opponent, who put him to death in B.C. 43.

Brutus, LUCIUS JUNIUS, an ancient Roman hero, son of Marcus Junius by the daughter of the elder Tarquin. He saved his life from the persecutions of Tarquin the Proud by feigning himself insane, whence his name *Brutus* (stupid). On the suicide of Lucretia (see *Lucretia*), however, he threw off the mask, and headed the revolt against the

Tarquins. Having secured their banishment, he proposed to abolish the regal dignity and introduce a free government with the result that he was elected to the consulship, in which capacity he condemned his own sons to death for conspiring to restore the monarchy. He fell in battle B.C. 509.

Brutus, MARCUS JUNIUS, a distinguished Roman, born B.C. 85, was at first an enemy of Pompey, but aided him after the outbreak of civil war until the battle of Pharsalia. He then surrendered to Cæsar, who made him the following year governor of Cisalpine Gaul, and afterwards of Macedonia. Soon, however, as an ardent patriot, joined the conspiracy against Cæsar, and by his influence ensured its success. In A.D. 42 Minor he joined Cassius in the subjugation of the Lycians and Rhodians.



Marcus Junius Brutus the meantime the triumvirs, Octavian, Antony, and Lepidus, had been successful at Rome, and were prepared to encounter the army of the conspirators, crossing the Hellespont, assembled at Philippi in Macedonia. Cassius and Brutus, though temporarily successful against Octavianus, was totally defeated twenty days later. He escaped with a few friends; but, seeing that his cause was hopelessly ruined, fell upon the sword held for him by his comrade Strato, and died (B.C. 42).

Brux (brüks), a town of Belgium on the Biela, in the neighborhood of which are extensive coal and the famous mineral springs of Seidlitz and Pullna, Pop. 21,525.

Bruyère (brü-yär), JEAN DE, a French writer, born in Paris in 1645. He was employed

education of the Duke of Bourbon, grandson of the great Condé, with a pension of 3000 livres, and was attached to his person during his life. Died 1692.

Bryant (brí'ant), WILLIAM CULLEN, an American poet and journalist, born in Cummington, Mass., in 1794. At ten years of age he published translations from Latin poets; at thirteen wrote *The Embargo*; and at eighteen his famous poem the *Thanatopsis*. In 1815 he was admitted to the bar, and practised with success till 1825, when he established the *New York Review*. In 1826 he became assistant editor of the *Evening Post*, a leading organ of the New York Democrats, of which he was long chief editor. His poems, first collected in 1832, took rank as the best America had up to that time produced. In 1842 he issued *The Fountain and other Poems*; and a new edition of his poems in 1858 was followed by metrical translations of the *Iliad*, in 1869 and of the *Odyssey* in 1871. His *Letters of a Traveler* record his visits to Europe in 1834. He died in 1878.

Bryce (bris), JAMES, a British man of letters and statesman, born at Belfast in 1838, and called to the bar in 1867. He was regius professor of civil law at Oxford 1870-93. He had already published his *Holy Roman Empire*, and taken high rank as a historical writer. His *American Commonwealth* is the best work on our system of government. Elected to Parliament in 1880, he was

made Chief Secretary for Ireland Dec. 1906, and ambassador to the United States in 1907. He resigned in 1912, and the following year was appointed a member of the Hague Court of Arbitration.

Bryn Mawr College (brin mår'), a non-sectarian college for women situated at Bryn Mawr, Pa., 10 miles W. N. W. of Philadelphia. It had in 1919, 65 instructors, 455 students and a library of 90,000 volumes.

Bryony (brí'o-ni), BRYONIA, a genus of plants, nat. order Cucurbitaceæ (gourds). The common bryony, a European species (*B. dioica*), is a climbing plant common in hedges.

Bryozoa (brí-o-zó'a; Gr. *bryon*, moss, and *zoon*, an animal), a name formerly given to the Polyzoa, from their moss-like appearance.

Buansuah (bu-an-sú'a; *Oyon pri-mævus*), a wild dog of Northern India.

Bubalus (bū'ba-lus), the genus to which the buffalo belongs.

Bubastis (bū-bas'tis), an ancient Egyptian town, so named from the goddess Bast, supposed to answer to the Greek Artémis or Diana. The cat was sacred to her, and the Bubasteia, or festivals of the goddess, were the largest and most important of the Egyptian festivals.

Bubo (bū'bō), an inflammatory swelling of a lymphatic gland, usually occurring in the groin, but also elsewhere.

Bubo, a genus of owls, including the great horned or eagle owl (*B. maximus*), and the Virginian horned owl (*B. virginianus*).

Bubonic Plague (bū-bon'ik), one of the most deadly of epidemic diseases. It is supposed to be the same as the Black Death or plague of the past centuries. (See *Plague*.) It receives its modern name from the fact that it attacks the lymphatic glands in the neck, armpits, groins, etc., producing bubos, and causing the skin to be mottled with purple spots. It has recently been discovered to be due to a bacillus, which has been identified in the blood of the patients and resembles that of chicken pox. Its ravages have been especially fatal in the East, where heedlessness as to sanitation and pure air expose the people to its attacks. It was so fatal in a recent outbreak at Bombay, India, that half the population fled from the city. Careful quarantine has kept it out of western Europe in recent years, but in 1900 it made its appearance in the Chinese quarter of San Francisco, where it was soon found that rats from shipboard, or rather

the fleas which infest the rats, conveyed the death-dealing germs. To eradicate it, a crusade was instituted against the rats of that city, which were killed in multitudes. In 1806 an anti-plague serum was administered to a Chinaman severely affected by the disease and proved effective, so that a remedy seems in hand against this dreaded disease. But sanitary regulations appear to afford comparative exemption, and its occasional title of the 'poor man's disease' probably arises from lack of cleanliness in the lower strands of population.

Buccaneers (buk-a-nērs'), a name derived from the Carib word *boucan*, a place for smoking meat, first given to European settlers in Hayti or Hispaniola, whose business was to hunt wild cattle and swine and smoke their flesh. In an extended sense it was applied to English and French adventurers, mostly seafaring people, who, combining for mutual defense against the arrogant pretensions of the Spaniards to the dominion of the whole of America, frequented the West Indies in the 17th century, acquired predatory and lawless habits, and became ultimately, in many cases, little better than pirates. The earliest association of these adventurers began about 1625, but they afterwards became much more formidable, and continued to be a terror until the opening of the 18th century, inflicting heavy losses upon the shipping trade of Spain, and even attacking large towns. Among their chief leaders were Montbars (Il exterminador), Peter the Great of Dieppe, L'Olonnas, de Busco, Van Horn, and the Welshman Henry Morgan, who, in 1670, marched across the isthmus, plundered Panama, and after being knighted by Charles II, became deputy-governor of Jamaica. The last great exploit of the buccaneers was the capture of Carthagena in 1697, after which they are lost sight of in the annals of vulgar piracy.

Buccinator (buk-si-nā'ter; Latin, a trumpeter, from *buccina*, trumpet), the trumpeter's muscle, a flat thin muscle forming the wall of the cheek, assisting in mastication and regulating the expulsion of the air in whistling or playing a wind-instrument.

Buccleugh (bu'klō), the title (now a dukedom) of one of the oldest families in Scotland, tracing descent from Sir Richard le Scott in the reign of Alexander III (latter half of the 13th century), and first becoming conspicuous in the person of the border chieftain Sir Walter Scott of Branxholm and Buccleugh—the latter an estate

in Selkirkshire. The son of Sir Walter bearing the same name, was for his valour and services raised to the peerage in 1606 as Lord Scott of Buccleugh, and his successor was made an earl in 1619. In 1603 the titles and estates devolved upon Anne, daughter of the second earl, who married the Duke of Monmouth, illegitimate son of Charles II, the pair in 1680 being created Duke and Duchess of Buccleugh, etc. Subsequently the dukedom of Queensberry passed by marriage into the family.

Buccon'idæ. See *Barbets*.

Bucentaur (bū-sen'tar), a mythical monster, half man and half ox. The splendid galley which the Doge of Venice annually wedded the Adriatic bore this name.

Bucephalus (bū-sef'a-lus; 'Ox-head the horse of Alexander the Great. On its death from a wound Alexander built over its grave, near Hydaspes, a city called *Bucephala*.

Bucer (bū'tser), MARTIN, a 16th century reformer, whose real name was Kuhhorn, cowhorn, of which *Bucer* is meant to be the Greek equivalent; he was in 1491 at Schlettstadt, in Alsace. In 1521 he left the Dominican order and came preacher at the court of the Elector Frederick, and afterwards in Strasbourg where he was professor in the university for twenty years. In 1548 Edward VI invited him to Cambridge, where he held the office of professor of theology, and died in 1551. In 1557 Queen Mary I caused his bones to be burned. Carlo Contarini called him the most learned divine among the heretics. He wrote a commentary on the Psalms under the name of Aretius Filinus, and many other works.

Bu'ceros. See *Hornbill*.

Buch (buh), LEOPOLD VON, a German geologist, born in 1774; died in 1853. He made extensive geological excursions on the continent of Europe, also visited the Canary Islands, the Hebrides, and the coasts of Scotland and Ireland. He was the author of various important works; and compiled a magnificent geological map of Germany.

Buchan (buh'an), a district of Scotland, lying in the N. E. of Aberdeenshire, between the mouths of the Deveron and the Ythan.

Buchan (buk'an or buh'an), WILLIAM, a Scotch medical writer, born in 1729; studied at Edinburgh, and commenced practice there, where also he published in 1769 his work entitled *Doctrina Medice; or, the Family Physician*.

Walter, his valor in 1606 and his success in 1619. Inolved upon Earl, who, illegitimate in 1673 success of the duke's marriage

a mythic half man galley in annually name. Ox-head'), Alexander in a wound e, near the phala.

a 16th century real name which Bucculent; born Alsace. In order and be the Elector a Strasburg, the university Edward VI here he held eology, and Queen Mary d. Cardinal most learned He wrote a s under the many other

N, a German 774; died in geological ex-Europe, and Islands, the Scotland and or of various piled a mag-Germany. strict of Scot-the N. E. of mouths of the

n), WILLIAM, l writer, born rgh, and com-e also he pub- lished *Dometio Physician*—the

first work of the kind published in Britain. Before his death, in 1805, nineteen large editions had been sold. It was translated into French, and became even more popular on the Continent and in America than at home. Buchanan was induced by its success to remove to London, where for many years he enjoyed a lucrative practice.

Buchanan (bu-kan'an), CLAUDIUS, a distinguished missionary in India, born at Cambuslang, Scotland, in 1763. He was educated at the Universities of Glasgow and Cambridge; became chaplain to the East India Company in 1795; and in 1800 was appointed professor of Greek, Latin, and English, and vice-provost in the college at Fort-William. He returned to Europe in 1808, and in 1811 published his *Christian Researches in Asia*, with a Notice of the Translation of the Scriptures into the Oriental Languages. He died in 1815.

Buchanan, GEORGE, a Scottish reformer, historian, scholar, and Latin poet, born in the parish of Killearn, Stirlingshire, in 1506. An uncle sent him in 1520 to the University of Paris, but the death of his uncle compelled his return, and in 1523 he joined the French auxiliaries employed by the regent, Albany, serving as a private soldier in one campaign against the English. He was then sent to the University of St. Andrews, where he took the Arts degree in October, 1525. Following his tutor, Mair or Major, to France, he became in 1526 a student in the Scots College of Paris; took his degrees; in 1529 was elected professor in the College of St. Barbe; and in 1532 was engaged as friend and tutor of Gilbert Kennedy, Earl of Cassillis, with whom he resided for five years, and to whom he inscribed his first published work, a translation of Linacre's *Rudiments of Latin Grammar*, printed in 1533. In 1536 Cassillis and Buchanan returned to Scotland, where the latter published his *Somnium*, a satire against the Franciscans. To shield him from the hostility of the Catholic party, James V retained him as preceptor to his natural son James Stuart, encouraging him to write the *Franciscanus*, one of the most pungent satires to be found in any language. By the Catholic influence he was arrested in 1539, but escaped to London and thence to France, where he became professor of Latin at Bordeaux, wrote his tragedies *Jephthes* and *Baptistes*, and translated the *Medea* and *Alcestis* of Euripides. His pupils was Montaigne, and he was on intimate terms

with the elder Scaliger. From Bordeaux Buchanan removed to Paris, and thence to Portugal to take a chair in the University of Coimbra. Here he was sentenced by the Inquisition to be confined in a monastery, but at length received permission to depart, and was shortly afterwards appointed to a regency in the College of Boncourt at Paris, an office held by him till 1555, when he was engaged as tutor to the son of the Comte de Brissac. During this period a portion of his version of the Psalms in Latin verse was published. About 1560 he returned to Scotland, and for some time acted as tutor to the young Queen Mary, to whom he dedicated his version of the Psalms. He had now openly joined the leaders of the Reformation. In 1566 he was nominated principal of St. Leonard's College, St. Andrews, and in the following year was chosen moderator of the General Assembly, the only instance of the chair being held by a layman. When Elizabeth called witnesses from Scotland to substantiate the charges against Mary, Buchanan accompanied the Regent Moray into England, and his evidence against her was highly important. In 1570 he was selected to superintend the education of King James, whom he made an excellent scholar. He was also appointed keeper of the privy-seal, a post which he held till 1578. In 1579 he published his *De Jure Regni apud Scotos*, a work in which he defended the rights of the people to judge of and control the conduct of their governors, and which subsequently had much influence on political thought. The dedication of his *Rerum Scotticarum Historia* ('History of Scotland') to the king is dated August 29, 1582, and on the 28th September following Buchanan died. As a Latinist both in prose and verse he was perhaps the best of his day, as evidenced by his *History* and his version of the Psalms. As regards its matter, the former is entirely uncritical, and is of value only for matters belonging to his own time.

Buchanan, JAMES, fifteenth president of the United States, born in Pennsylvania in 1791; son of an Irishman who had quitted Europe in 1783. James Buchanan was educated at Dickinson College, Carlisle; was admitted to the bar in 1812; was elected to the legislature in Pennsylvania in 1814; and in 1820 was elected to Congress, of which he continued a member till 1831. After having been sent to Russia to conclude a commercial treaty, he was in 1834 elected to the Senate, and under the presidency of Polk (1845-49) was appointed secretary of state. During the

presidency of General Taylor he retired from public life, but in 1853 General Pierce, who was then president, named him minister of the United States at London. He returned to America in 1856 as Democratic candidate for the presidency, and was elected by a large majority over Fremont, the Republican candidate, and inaugurated in March, 1857. The storm which broke out on the election of Lincoln and the secession from the Union of many of the southern states, brought on a situation which he was incompetent to handle, and the war-like movement in the South went on without any effort on his part to check it. He lived in retirement after the close of his administration (1861), of which he published an account two years before his death, June 1, 1868.

Buchanan, ROBERT, an English poet, born in 1841; died in 1901. His earliest volumes of verse—*Undertones* (1863), *Idylls and Legends of Inverburn* (1865), and *London Poems* (1866), gained him a good reputation for truth, simplicity, humor, and pathos, and he afterwards produced various volumes of poetry which were no less well received; such as *Wayside Poesies*; *The Drama of Kings*; *Ballads of Life, Love, and Humor*, etc. He also wrote novels—*The Shadow of the Sword*, *God and the Man*, *The Child of Nature*, *Forglome Manor*, etc., and a number of plays.

Buchanites (bu-kan'its), an extraordinary sect of Scottish fanatics which sprang up in 1783 in a dissenting church at Irvine, Ayrshire, under the leadership of a Mrs. (more commonly known as Lucky) Buchan. She declared herself to be the woman of Rev., xii, and Mr. White, the clergyman of the congregation to which she belonged, her 'manchild,' and taught her followers they would be translated to heaven without tasting of death. The sect was always small, and became extinct soon after the death of Mrs. Buchan in 1792. They are said to have lived in promiscuous intercourse, and to have despised marriage.

Buchan Ness (bu'kan nes), the easternmost promontory of Scotland, near Peterhead, Aberdeenshire.

Bucharest (bū - ka - rest'). See *Bukharest*.

Bucharia (bū-ka'ri-a). See *Bokhara*.

Buchez (bū-shā), PHILIPPE JOSEPH BENJAMIN, a French physician and writer, born in 1796. He wrote *Introduction à la Science de l'Histoire* (1833) and *Traité Complet de Philosophie* (1839). Between 1833 and 1838 he pub-

lished, in concert with M. Roux-Lavergne, a *Histoire Parlementaire de la Révolution Française* (40 vols.). After the revolution of 1848 he was elected to the constituent National Assembly, and was for a brief period its wholly incompetent president. Retiring from public life he confined himself to literature, his chief subsequent work being the *Histoire de la Formation de la Nationalité Française* (1859). He died in 1865.

Buchholz (bū'hōlts), a town of Saxony, with extensive manufactures of laces, trimmings, etc. Pop. 9307.

Buchon (bū-shōn), J. v ALEXANDRE, a French historical writer, born in 1791; died in 1846. After a period of European travel for the collection of documents he published his *Collection des Chroniques Nationales Françaises écrites en Langue Vulgaire du XIII^e et du XIV^e Siècle* (47 vols., 1824-29), commencing with the *Chroniques de Troisième*. For a short time (1828-29) he was inspector of the archives and libraries of France. Among other works may be noted his *Histoire Populaire de France* (1832); *La Grèce Continentale et Morée* (1843).

Buchu (buk'u). See *Bucku*.

Buck, the male of the fallow-deer, the goat, rabbit, and hare.

Buckau (buk'ou), a suburb of Magdeburg, Prussian Saxony, and a flourishing manufacturing town, especially in machinery and iron goods.

Buckbean, ROSEBEAN, or MAB, *TRIFOLIUM* (*Menyanthes trifoliata*), a beautiful plant of the Gentianaceæ, common in spongy, boggy soils, and found throughout Europe, Siberia, and in North America. It grows from 6 to 12 inches in height, and flowers in June or July, the flower-stalk terminating in a thyrse of white flowers, while the inner surface of the corolla has a coating of dense fleshy hairs. The whole plant, and the root especially, has an intensely bitter taste, and formerly ranked highly as a tonic.

Bückeberg (buk'e-burh), a town of Germany, capital of the principality of Schaumburg-Lippe. Pop. 6000.

Buckeye (buk'i), an American name for certain species of chestnuts.

Buckhound, a kind of hound smaller than a staghound, once commonly used in Britain for hunting bucks. The name of the Buckhounds is still the title of an officer of the royal household in En-

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Buckie (buk'ē), an important fishing town on the coast of Banff-shire, Scotland. Pop. 6540.

Buckingham (buk'ing-am), or **BUCKS**, an inland county of England, bounded by Northampton, Bedford, Hertford, Middlesex, Berks, and Oxford; area about 730 sq. miles, or 457,000 acres, of which over 400,000 are under crops or permanent pasture. The rich vale of Aylesbury stretches through the center, and a portion of the Chiltern range across the south of the county, which is watered by the Ouse, the Thames, and the Thames. The breeding and fattening of cattle and pigs are largely carried on, also the breeding of horses, and much butter is made. The manufactures are unimportant, among them being straw-plaiting, thread lace, and the making of wooden articles, such as beechen chairs, turnery, etc. There are also paper-mills, silk-mills, etc. The mineral productions are of no great importance. The county comprises eight hundreds, those of Stoke, Burnham, and Desborough being known as 'the Chiltern Hundreds.' Buckingham is nominally the county town, but Aylesbury is the assize town. The county returns three members to the House of Commons for the Aylesbury, Buckingham, and Wycombe districts. Pop. 219,583.—**BUCKINGHAM**, the county town, a municipal borough, is pleasantly situated on a peninsula formed by the Ouse. Malting and tanning are carried on, and some lace is made. Pop. 3282.

Buckingham, GEORGE VILLIERS, DUKE OF, a favorite of James I and Charles I of England, was born in 1592, his father being George Villiers, knight. At eighteen he was sent to France, where he resided three years, and on his return made so great an impression on James I that in two years he was made a knight, a gentleman of the bed-chamber, baron, viscount, Marquis of Buckingham, lord high-admiral, etc., and at last dispenser of all the honors and offices of the three kingdoms. In 1623, when the Earl of Bristol was negotiating a marriage for Prince Charles with the Infanta of Spain, Buckingham went with the prince incognito to Madrid to carry on the suit in person in the hope of securing the Palatinate as dowry. The result, however, was the breaking off of the marriage and the declaration of war with Spain. During his absence Buckingham was created duke. After the death of James in 1625 he was sent to France as proxy for Charles I to marry the Princess Henrietta Maria. In 1626, after the failure of the Cadiz expedition,

he was impeached, but saved by the favor of the king. Despite the difficulty in obtaining supplies, Buckingham took upon himself the conduct of a war with France, but his expedition in aid of the Rochelle proved an entire failure. In the meantime the spirit of revolt was becoming more formidable; the Petition of Right was carried despite the duke's exertions; and he was again protected from impeachment only by the king's prorogation of parliament. He then went to Portsmouth to lead another expedition to Rochelle, but was stabbed on Aug. 24, 1628, by John Felton, an ex-lieutenant who had been disappointed of promotion.

Buckingham, GEORGE VILLIERS, DUKE OF, son of the preceding, born at Westminster 1627; studied at Trinity College, Cambridge; served in the royal army under Rupert and then went abroad. In 1648 he returned to England, was with Charles II in Scotland and at the battle of Worcester, and afterwards served as a volunteer in the French army in Flanders. He then returned to England, and in 1657 married the daughter of Lord Fairfax. At the Restoration he became master of the horse and one of the king's confidential cabal (1667-73). In 1666 he engaged in a conspiracy, and in 1676 was committed to the tower for a contempt by order of the House of Lords; but on each occasion he recovered the king's favor. On the death of Charles he retired to his seat in Yorkshire, where he died in 1688. Among his literary compositions the comedy of the *Rehearsal* (1671) takes the first place.

Buckingham, JAMES SILK, an English traveler, writer, and lecturer, born near Falmouth, in 1786. After trying several professions, and wandering over great part of the world, he came to London, where he established the *Athenæum*, well known as a literary journal. He also published his journals of travel in Palestine, Arabia, Mesopotamia, and Assyria and Media. In 1832 he was chosen member of parliament for Sheffield, and retained his seat till 1837. Subsequently he made a tour of three years in America. In 1843 he became secretary to the British and Foreign Institute. He also published volumes on his Continental tours and an autobiography. His death took place in 1855.

Buckingham Palace, a royal palace in London, facing St. James's Park, built in the reign of George IV, and forming one of the residences of the present king, George V.

Buckland (buk'land), FRANCIS TREVELYAN, English naturalist, son of Rev. W. Buckland; born in 1826; studied at Winchester and at Christ Church, Oxford. From 1848 to 1851 he was student, and from 1852 to 1853 house-surgeon, at St. George's Hospital. He became assistant-surgeon in the 2d Life-Guards in 1854. On the establishment of the *Field* newspaper in 1856 he joined the staff, writing for it until 1865. In 1866 he commenced a weekly journal of his own, *Land and Water*, and in 1867 was appointed an inspector of salmon fisheries. He died in 1880. His best-known books are his *Curiosities of Natural History* (4 vols. 1857-72), the *Logbook of a Fisherman and Zoologist* (1875), and the *Natural History of Fishes* (1881); but there was also a large mass of desultory work showing much natural sagacity. He died Dec. 20, 1880.

Buckland, REV. WILLIAM, an English geologist, born at Axminster, Devon, in 1784; educated at Winchester and at Corpus Christi College, Oxford, where he held a fellowship from 1808 to 1825. In 1813 he was appointed reader in mineralogy at Oxford; and in 1818 a readership of geology was expressly instituted for him. A paper contributed by him to the *Philosophical Transactions* in 1822, entitled *Account of an Assemblage of Fossil Teeth and Bones discovered in a Cave at Kirkdale, Yorkshire, in the Year 1821*, procured for him the Copley medal; and on this was founded his *Reliquiæ Diluvianæ*, published in 1823. In 1825 he was presented by his college to the living of Stoke Charity, Hants, and the same year became one of the canons of Christ Church Cathedral, Oxford. In 1832 he acted as president of the British Association. In 1836 his *Bridgewater Treatise* was published, under the title of *Geology and Mineralogy considered with Reference to Natural Theology*. In 1845 he was made Dean of Westminster, and in 1847 one of the trustees of the British Museum. He died in 1856.

Buckle (buk'1), HENRY THOMAS, an English historical writer, born in 1822, the son of a wealthy London merchant. At an early age he entered his father's counting-house, but at the age of eighteen, on inheriting his father's fortune, he devoted himself entirely to study. The only thing he allowed to distract him from his more serious pursuits was chess, in which he held a foremost place amongst contemporary players. His chief work, a philosophic *History of Civilization*, of which only two volumes (1858 and 1861) were completed, was

characterized by much novel and suggestive thought, and by the bold co-ordination of a vast store of materials drawn from the most varied sources. While exciting much attention at the time, later study has largely invalidated its theoretical views. Three volumes of his *Miscellaneous and Posthumous Works* were edited by Helen Taylor in 1872. He died, while traveling, at Damascus, May 20, 1862.

Buckler (buk'ler), a kind of small shield formerly worn on the left arm, and varying in form and material, among the latter being wicker-work, wood covered with leather, a combination of wood and metal, etc.

Buckram (buk'ram), a coarse textile fabric stiffened with glue and used in garments to give them or keep them in the form intended.

Buckshot, a kind of large leaden shot used for killing deer or other large game.

Buck'skin, a kind of soft leather of a yellowish or grayish color made originally from deerskins, but now usually from sheepskins. The softness which is its chief characteristic is imparted by using oil or brains in dressing it. The name is also given to a kind of cloth otherwise called doeskin.

Buck'thorn (*Rhamnus*), the name of an extensive genus of trees and shrubs, order Rhamnaceæ. Several species belong to N. America. The common buckthorn (*Rhamnus catharticus*), an European and North American shrub, grows to 7 or 8 ft., has stout spines on its branches, elliptical and serrated leaves, male and female flowers of different plants, a greenish-yellow calyx, no corolla, and a round black berry. The flowers are pure white, but harsh in action. The bark yields a yellow dye, the berries sap green. Dyer's buckthorn (*R. infectorius*) yields French or yellow berries.

Bucku (buk'u), the name of several plants belonging to the Cruciferae. The genus *Barosma*, order Rutaceæ, used in medicine, in the form of a powder or tincture, in disorders of the urinary organs.

Buckwheat (buk'wēt), or BRANK (*Polygonum esculentum*), a plant of order Polygonaceæ with branched her- ceous stem, somewhat arrow-shaped leaves, and purple flowers, growing to the height of about 30 inches and bearing a small triangular grain of a brownish black without and white within. The shape of its seeds gave it its German name *Buchweizen*, 'be-

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wheat,' whence the English name. The plant was first brought to Europe from Asia by the Crusaders, and hence in France is often called Saracen corn. It grows on the poorest soils. It is cultivated in China and other eastern countries as a bread-corn. In Europe buckwheat has been principally cultivated as food for oxen, swine, and poultry; but in Germany it serves as an ingredient in pottage, puddings, and other food, and in the United States buckwheat riddle cakes are much esteemed.

Bucyrus (bū-cī'rus), a city, capital of Crawford Co., Ohio, 69 miles s. of Toledo; center of a farming country and with manufactures of machinery, fans, etc. It is celebrated for its mineral springs. Pop. 8122.

Buczacz (bŭ'chach), a town of Austria, in Galicia, on the Stripa. Has a castle and an interesting town-hall. Pop. (1910) 14,241.

Bud, the name of bodies of various form and structure, which develop upon vegetables, and contain the rudiments of future organs, as stems, branches, leaves, and organs of fructification. Upon exogenous plants they are in their commencement cellular prolongations from the medullary rays, which force their way through the bark. In general, a single bud is developed each year in the axil of each leaf, and there is one terminating the branch called a terminal bud. The life of the plant during winter is stored up in the bud as in an embryo, and it is by its vital action that on the return of spring the flow of sap from the roots is stimulated to renewed activity. Buds are distinguished as leaf-buds and flower-buds. The latter are produced in the axil of leaves called floral leaves or bracts. The terminal bud of a branch is usually a flower-bud, and as cultivation is capable of producing flower-buds in place of leaf-buds, the one is probably a modification of the other.

Budapest (bū-da-pesht'), the official name of the united towns of Pest and Buda or Ofen, the one on the right, the other on the left, of the Danube, forming the capital of Hungary, the seat of the imperial diet of the Hungarian ministry and of the supreme court of justice. Buda, which is the smaller of the two, and lies on the west bank of the river, consists of the fortified Upper Town on a hill; the Lower Town or Wasserstadt at the foot of the hill, and several other districts. Among the chief buildings are the royal castle and several palaces, the arsenal, town-hall, government offices, etc., and the finest

Jewish synagogue in the empire. The mineral baths of Buda have long been famous, the Bruckbad and Kaiserbad having both been used by the Romans. Pest, or the portion of Budapest on the left or east bank of the river, is formed by the inner town of Old Pest on the Danube, about which has grown a semi-circle of districts—Leopoldstadt, Theresienstadt, Elizabethstadt, etc. The river is at this point somewhat wider than the Thames at London, and the broad quays of Pest extend along it for from two to three miles. Pest retains, on the whole, fewer signs of antiquity than many less venerable towns. Its fine frontage on the Danube is modern, and includes the new houses of parliament, the academy, and other important buildings. The oldest church dates from 1500; the largest building is a huge pile used as barracks and arsenal. There is a well-attended university. In commerce and industry Budapest ranks next to Vienna in the empire. Its chief manufactures are machinery, gold, silver, copper, and iron wares, chemicals, silk, leather, tobacco, etc. A large trade is done in grain, wine, wool, cattle, etc. Budapest is strongly Magyar, and as a factor in the national life may almost be regarded as equivalent to the rest of Hungary. It was not until 1799 that the population of Pest began to outdistance that of Buda; but from that date its growth was very rapid and out of all proportion to the increase of Buda. In 1799 the joint population of the two towns was little more than 50,000; in 1886 it was 411,917; in 1910, 880,371.

Budaun (bū-dā'un), a town of India, N. W. Provinces, consisting of an old and a new town, the former partly surrounded by ancient ramparts; there is a handsome mosque, American mission, etc. Pop. about 35,000.—The district of Budaun has an area of 2000 sq. miles. Pop. about 1,000,000.

Buddha (būd'dhā; 'the Wise' or 'the Enlightened'), the sacred name of the founder of Buddhism, an Indian sage who appears to have lived in the 5th century B.C. His personal name was Siddhartha, and his family name Gautama; and he is often called also Sakya-muni (from *Sakya*, the name of his tribe, and *muni*, a Sanskrit word meaning a sage). His father was the king of Kapilavastu, a few days' journey north of Benares. Siddhartha, filled with a deep compassion for the human race, left his father's court, and lived for years in solitude and contemplation till he had penetrated the mysteries of life and become the Buddha. He then began to

teach his new faith, in opposition to the prevailing Brahmanism, commencing at Benares. Among his earliest converts were the monarchs of Magadha and



Buddha.—From a Burmese Bronze.

Kosala, in whose kingdoms he chiefly passed the latter portion of his life, respected, honored, and protected. See next article.

Bud'dhism, the religious system founded by Buddha, one of the most prominent doctrines of which is that *Nirvāna*, or an absolute release from existence, is the chief good. According to it, pain is inseparable from existence, and consequently pain can cease only through *Nirvāna*; and in order to attain *Nirvāna* our desires and passions must be suppressed, the most extreme self-renunciation practised, and we must, as far as possible, forget our own personality. In order to attain *Nirvāna* eight conditions must be kept or practised. The first is in Buddhistic language *right view*; the second is *right judgment*; the third is *right language*; the fourth is *right purpose*; the fifth is *right profession*; the sixth is *right application*; the seventh is *right memory*; the eighth is *right meditation*. The five fundamental precepts of the Buddhist moral code are: not to kill, not to steal, not to commit adultery, not to lie, and not to give way to drunkenness. To these there are added five others of less importance, and binding more particularly on the religious class, such as to abstain from repasts taken out of season, from theatrical representations, etc. There are six fundamental virtues to be practised by all men alike, viz., charity, purity, patience, courage, contemplation, and knowledge. These are the virtues that are said to 'conduct a man to the other shore.' The

devotee who strictly practises them has not yet attained *Nirvāna*, but is on the road to it. The Buddhist virtue of charity is universal in its application, extending to all creatures, and demanding sometimes the greatest self-denial and sacrifice. There is a legend that the Buddha in one of his stages of existence (for he had passed through innumerable transmigrations before becoming 'the enlightened') gave himself up to be devoured by a famishing lioness which was unable to suckle her young ones. There are other virtues, less important, indeed than the six cardinal ones, but still binding on believers. Thus not only is lying forbidden, but evil speaking, coarseness of language, and even vain and frivolous talk must be avoided. Buddhist metaphysics are comprised in three theories—the theory of transmigration (borrowed from Brahmanism), the theory of the mutual connection of causes, and the theory of *Nirvāna*. According to the first when a man dies he is immediately born again or appears in a new shape. The shape depends upon the merit or demerit of his life. He may reappear as a divinity or as a degraded slave, an animal, a plant or even a stone or clod. If he has been very wicked he will be born into one of the 136 Buddhist hells, and will need many millions of years to attain the state of earthly existence again. According to the second, life is the result of twelve conditions, which are by turns causes and effects. Thus there would be no death were it not for birth; it is therefore the effect of which birth is the cause. Again, there would be no birth were there not a continuation of existence. Existence has for its cause our attachment to things, which again has its origin in desire; and so on through sensation, contact, the organs of sensation and heart, name and form, ideas, etc., up to ignorance. This ignorance, however, is not ordinary ignorance, but the fundamental error which causes us to attribute permanence and reality to things. Then, is the primary origin of existence and all its attendant evils. *Nirvāna*, or extinction is eternal salvation from the evils of existence, and the end which every Buddhist is supposed to seek. Sakya-muni did not leave his doctrine in writing; he declared them orally, and they were carefully treasured up by his disciples, and written down after his death. The determination of the contents of the Buddhist scriptures as we possess them was the work of successive councils, and was finished several centuries at least before Christ. Buddhism involving a protest against

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Buddhist Architecture

distinctions it was eagerly adopted by the Dasyus or non-Aryan inhabitants of Hindustan. It was pure, moral, and humane in its origin, but it came subsequently to be mixed up with idolatrous worship of its founder and other deities. Although now long banished from Hindustan by the persecutions of the Brahmans, Buddhism prevails in Ceylon, Burmah, Siam, Anam, Tibet, Mongolia, China, Java, and Japan, and its adherents are said to comprise about a third of the human race.

Buddhist Architecture.

Architecture.

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Budding (bud'ing), the art of multiplying plants by causing the leaf-bud of one species or variety to grow upon the branch of another. The operation consists in shaving off a leaf-bud, with a portion of the wood beneath it,



Budding.

which portion is afterwards removed by a sudden jerk of the operator's finger and thumb, aided by the budding-knife. An incision in the bark of the stock is then made in the form of a T; the two side lips are pushed aside, the bud is thrust between the bark and the wood, the upper end of its bark is cut to a level with the cross arm of the T, and the whole is bound up with worsted or other soft fastening, the point of the bud being left exposed. In performing the operation, a knife with a thin flat handle and a blade with a peculiar edge is required. The bud must be fully formed; the bark of the stock must separate readily from the wood below it; and young branches should always be chosen, as having beneath the bark the largest quantity of cambium or viscid matter out of which tissue is formed. The maturer shoots of the year in which the operation is performed are the best. The autumn is the best time for budding, though it may also be practised in the spring.

Budé (bü-dä), GUILLAUME, or BU-DÆUS, a French scholar, born at Paris in 1467, and died in 1540. After a lawless youth he devoted himself to the study of literature. Among his philosophical, philological, and juridical works, his treatise *De Asse* (1514) and his *Commentarii Græcæ Linguae* are of the greatest importance. By his influence the Collège Royal de France was founded.

Bude Light, an exceedingly brilliant light, invented by Mr. Gurney, of Bude, Cornwall, and produced

by directing a current of oxygen into the interior of the flame of an Argand lamp or gas-burner.

Budgell (budj'el), EUSTACE, an ingenious writer, author of about three dozen papers, signed 'X,' in the *Spectator*; born 1686; died 1737. He was a first cousin to Addison, and went with him to Dublin in 1709 as secretary. On the accession of George I Budgell obtained several valuable Irish appointments, from which he was removed for an attack on the lord-lieutenant, the Duke of Bolton. He lost three-fourths of his fortune in the South Sea Bubble, and spent the rest in a fruitless attempt to get into parliament. Disgraced by an attempted fraud in connection with Dr. Matthew Tindal's will, he committed suicide by drowning in the Thames.

Budget (budj'et), the annual financial statement which the British Chancellor of the Exchequer makes in the House of Commons. It contains a view of the general financial policy of the government, and at the same time presents an estimate of the probable income and expenditure for the following twelve months, and a statement what taxes it is intended to reduce, increase, or abolish, or what new ones it may be necessary to impose.

Budis'sin. See *Bautzen*.

Budweis (bud'vis), a city of Bohemia, 35 miles S. of Prague, well built, with a cathedral and episcopal palace, a flourishing trade, and manufactures of earthenware, cloths, machinery, etc. Pop. 39,630.

Buell (bü'el), DON CARLOS, an American soldier (1818-98), born at Marietta, O. He served in the Mexican war and was in command of the Army of the Ohio in the Civil war, taking part in the battle of Shiloh.

Buenos Ayres (bö'nus a'riz. *Sp. pron. bwā'nos i'res*), the largest and most important city of South America, capital of the Argentine Republic, on the S. W. bank of the La Plata, 175 miles from its mouth. It was founded successfully in 1580 by Juan de Garay, and is built with great regularity, the streets uniformly crossing each other at right angles. Many of the old and narrow streets are being replaced by modern boulevards. It contains the palace of the president, the House of Representatives, a town-hall, a number of hospitals and asylums, a cathedral, several Protestant churches; several theaters, an opera house, and a university, founded in 1821, and attended by over 4000 students. There are also a medical

Buffalo

school, normal and other schools, besides literary and scientific societies, a national library, museum of natural history, zoological garden and observatory. There is no harbor, and large vessels can come only within 8 or 9 miles of the town, but extensive harbor works have been begun. The nearest good harbor is at La Plata, a new town 30 miles lower down the estuary, and since 1884 the capital of the province. The port of both cities is now Ensenada, a village on the Bay of Ensenada, a few miles from La Plata. Buenos Ayres is one of the leading commercial centers of South America, its exports and imports together annually amounting to over \$500,000,000. Chief exports are ox and horse hides, sheep and other skins, wool, tallow, horns, etc. There are nine railways running from the city, and 460 miles of tramway in the city and suburbs. About one-fourth of the inhabitants are whites; the rest are Indians, negroes, and mixed breeds. Population (1914), 1,560,163.—The province of Buenos Ayres has an area of about 117,777 sq. miles, and presents nearly throughout level or slightly undulating plains (*pampas*), which afford pasture to vast numbers of cattle and wild horses. These constitute the chief wealth.

Buffalo (*būf'a-lō*), an ungulate or hoofed ruminant mammal, family Bovidae or oxen, the best-known species of which is the common or Indian buffalo (*Bubalus Buffelus* or *Bos Bubalus*), larger than the ox and with stouter limbs, originally from India, but now



1, Head of Cape Buffalo (*Bubalus Caffer*).
2, Head of Indian Buffalo (*Bubalus Buffelus*).

found in most of the warmer countries of the Eastern Continent. A full-grown male is a bold and powerful animal, quite a match for the tiger. The buffalo is less docile than the common ox, and is fond of marshy places and rivers. It is, however, used in tillage, draught, and

carriage in Southern Asia and Italy. The female gives much more milk than the cow, and from the milk the *ghee* or clarified butter of India is made. The hide is exceedingly tough, and a valuable leather is prepared from it, but the flesh is not very highly esteemed. Another Indian species is the arnee (*B. arni*), the largest of the ox family. The Cape buffalo (*Bubalus Caffer*), the African species, is distinguished by the size of its horns, which are united at their bases, forming a great bony mass on the front of the head. It attains a greater size than an ordinary ox, and is a fierce creature, the most dreaded of African animals. It attacks man without provocation and has never been domesticated. The name is also applied to wild oxen in general, and particularly to bison of North America. See *Bison*.

Buffalo, a city of New York, at the eastern extremity of Lake Erie, at the mouth of the Buffalo River, and the head of the Niagara River. The position of Buffalo on the great water and railway channels of communication between the west and the east makes it the center of a vast trade in grain, livestock and other commodities. The harbor is capacious, and is protected by an extensive breakwater. The Barge Canal system has its western terminus here and its enlarged form will permit of the passage of canal boats, of 1500 tons burden, which can carry freight from Buffalo through to New York and Boston. Buffalo is noted for its fine office buildings and beautiful homes and streets. There are six large parks, many smaller ones and a system of boulevards. The large buildings include the Marine Bank, Prudential, the New York Telephone, Iroquois, the Electric, the Manufacturers and Traders' Bank, Ellicott Square Chamber of Commerce, Erie County Building and County Hall, Post Office, State Armory, State Arsenal, Public Library and other buildings. Other institutions include the Albright Art Gallery, Buffalo Historical Society, Botanical gardens, large hospitals, University of Buffalo, Technical High School and other schools. Buffalo has some 2000 manufacturing plants, the leading industries being slaughtering and meat packing, flour and machine shop, flour-mill and mill, automobile, soap, printing and lishing and malt. Its grain trade is extensive and employs a large number of elevators with a capacity of 30,000,000 bushels. The annual handling of grain amounts to over 100,000,000 bushels of flour, 14,000,000 barrels. There is a large export business in livestock, lumber and coal, while the iron and

works rank next to those of Pittsburgh. Buffalo was founded in 1801, was burned by British and Indians in 1813, and became a city in 1832. The Pan-American Exposition, at which President McKinley was assassinated, was held here in 1901. Pop. 460,455 in 1913.

Buffalo Berry (*Shepherdia argentea*), a shrub of the oleaster family, a native of the States and Canada, with lanceolate, silvery leaves and close clusters of bright-red acid berries about the size of currants, which are made into preserves and used in various ways.

Buffalo Bill. See *Cody*.

Buffalo Grass (*Tripsacum dactyloides*), a strong-growing North American grass, so called from forming a large part of the food of the buffalo, and said to have excellent fattening properties; called also *gama grass*.

Buffer (buf'er), any apparatus for deadening the concussion between a moving body and the one on which it strikes. In railway carriages they are placed in pairs at each end, and are fastened by rods to springs under the framework, to deaden the concussions caused when the velocity of part of the train is checked.

Buffet (buf'et, buf'a, bō-fa'), a cupboard, sideboard, or closet to hold china, crystal, plate, and the like. The word is also very commonly applied to a space set apart for refreshments.

Buff Leather, a sort of leather prepared from the skin of the buffalo and other kinds of oxen, dressed with oil, like chamois. It is used for making belts, pouches, gloves, etc.

Buffon (bu-fōn), GEORGE LOUIS LECLEERC, COUNT DE, celebrated French naturalist, was born at Montbard, Burgundy, in 1707; died in Paris in 1788. Being the son of a rich man, he was able to travel, and he visited Italy and England. In 1739 he was appointed superintendent of the Royal Garden at Paris (now the Jardin des Plantes), and devoted himself to the great work on *Natural History* which occupied the most of his life. It is now obsolete and of small scientific value, but it long had an extraordinary popularity, and was the means of diffusing a taste for the study of nature throughout Europe. After an assiduous labor of ten years the first three volumes were published, and between 1749 and 1767 twelve others, which comprehend the theory of the earth, the nature of animals, and the history of man and the mammalia.

In these Buffon was assisted by Daubenton in the purely anatomical portions. The following nine volumes, which appeared from 1770 to 1783, contain the history of birds, from which Daubenton withdrew his assistance, the author being now aided by Guéneau de Montbelliard, and afterwards by the Abbé Bexon. Buffon published alone the five volumes on minerals, from 1783 to 1788. Of the seven supplementary volumes, of which the last did not appear until after his death in 1789, the fifth formed an independent whole, the most celebrated of all his works. It contains his *Epochs of Nature*, in which the author gives a second theory of the earth, very different from that which he had traced in the first volumes, though he assumes at the commencement the air of merely defending and developing the former. Buffon was raised to the rank of count by Louis XV, whose favor, as also that of Louis XVI, he enjoyed. His works were translated into almost every European language.

Buffoon (bu-fūn'), a merry-andrew, a clown, a jester; from the Ital. *buffone*, from *buffare*, to jest, to sport. *Buffo*, in Ital., is the name given to a comic actor; a burlesque play is called a *commedia buffa*, and a comic opera *opera buffa*. The Italians, however, distinguished the *buffo cantante*, which requires good singing, from the *buffo comico*, in which there is more acting.

Bufonidæ (bu-fon'i-dē), a family of tailless batrachians, comprehending the toads.

Bug, or Bog, a river in European Russia, which falls into the estuary of the Dnieper near Kherson, after a course of about 500 miles. Another river of same name, the Western Bug, rises in Galicia, and falls into the Vistula about 20 miles N. N. W. of Warsaw. Both are navigable for considerable distances.

Bug, a name given to the *Cimex lectularius*, otherwise known as the housebug or bedbug, or any member of this genus or of the family Cimicidæ. The common bug is about 3-16 inch long, wingless, of a roundish, depressed body, dirty rust color, and emits an offensive smell when touched. The female lays her eggs in summer in the crevices of bedsteads, furniture, and walls of rooms. The larvæ are small, white, and semitransparent. They attain full size in eleven weeks. The mouth of the bug has a three-jointed proboscis, which forms a sheath for a sucker. It is fond of human blood, but

eats various other substances. The name was formerly applied loosely to insects of various kinds, and in the United States it is generally applied to what are called *beetles* in England.

Bugeaud (bü-zhō), THOMAS ROBERT, DUKE D'ISLY, a marshal of France, born in 1784; died at Paris in 1849. He entered the army in 1804 as a simple grenadier, but rose to be colonel before the fall of Napoleon. After the revolution of 1830 he obtained a seat in the Chamber of Deputies. He was afterwards sent to Algeria, where he gained many advantages over the Arabs. On the revolution of 1848 he adhered to Louis Philippe to the last. Under the presidency of Louis Napoleon he was appointed commander-in-chief of the army of the Alps.

Bugenhagen (bū'gē-n-hā-gē-n), JOHANN, a German reformer, and friend and helper of Luther in preparing his translation of the Bible. He was born in 1485, and died in 1538. He fled from his Catholic superiors to Wittenberg in 1521, where he was made, in 1522, professor of theology. He effected the union of the Protestant free cities with the Saxons, and introduced into Brunswick, Hamburg, Lübeck, Pomerania, Denmark, and many other places the Lutheran service and church discipline. He translated the Bible into Low German (Lübeck, 1533); wrote an *Exposition of the Book of Psalms* and a *History of Pomerania*.

Bugge (bug'ge), ELSEUS SOPHUS, a Norwegian scholar, born at Laurvig in 1833. In 1864 he became a professor of Old Norse in the national university. He published editions of old Norse poems and later folk songs, but is best known from his important works on runic inscriptions.

Buggy (bug'i), a name given to several species of carriages or gigs: in England, a light one-horse two-wheeled vehicle without a hood; in the U. States, a light one-horse four-wheeled vehicle, with or without a hood or top; in India, a gig with a large hood to screen those who travel in it from the sun's rays.

Bugis (bü'giz), a people of the Indian Archipelago, chiefly inhabiting the eastern coast and a good deal of the interior of the southern peninsula of the island of Celebes, their chief town being Boni. They are described as peaceable, orderly, and well behaved, are the chief carriers and factors of the Indian seas, and are engaged in the manufacture of iron, copper, cotton, etc., and in trepang, pearl, and other fisheries. Large

communities of them have also been formed in Borneo, in Sumatra, and many small islands of the archipelago.

Bugle (bü'gl), a military music brass wind-instrument of horn kind, sometimes furnished with keys or valves. It is used in the armies of various nations to sound signal-calls. The name is an abbreviation of *buffalo-horn*, that is, buffalo-horn, from *Ovis montanus*, a buffalo.

Bugle, the common name for *Ajuga reptans*, a genus of labiate plants. Two of the species are British, *A. reptans*, a hedge-side plant with dark leaves and purplish flowers, formerly held in esteem as an application to wounds; *A. chamæpitys*, yellow bugle, a plant which grows in sandy fields, rare in the United States.

Bugle, a shining, elongated glass bead, usually black, used in decorating female apparel and also in trafficking with savage tribes.

Bugloss (bü'glos), a popular name applied to a number of plants of the natural order Boraginaceae, and in particular to the alkanet (*Alkanet*).

Buhl-work (bül'wurk), a kind of inlaid work, said to have been invented by Boulle, a French cabinet-maker, in the reign of Louis XIV. It consisted at first of unburnt gold, brass, enamel, or mother-of-pearl worked into complicated and ornamental patterns, and inserted in a ground of dark-colored metal, wood, or tortoise shell; but at a later period the use of wood of a different color was introduced by Reisner, and to his process the modern practice of buhl-work is chiefly confined.

Buhrstone (bür'stōn), BURESTON, a name given to certain siliceous or siliceo-calcareous stones whose dressed surfaces present a burr-like cutting texture, whence they are much used for millstones. The most esteemed varieties are obtained from the upper fresh-water beds of the Paris basin and from the Eocene strata of South America.

Building Societies, joint-stock benefit societies for the purpose of raising by periodic payments a fund to assist members in obtaining small portions of landed property and houses, which are mortgaged to the society till the amount of shares drawn on shall be fully repaid with interest. The stock is divided into shares, valued at \$200 each, payable in monthly instalments of \$1 for each share. In most societies the money is loaned

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to the member bidding the highest premium for its use, which premium is in some cases deducted at once, in others is paid in monthly instalments. The interest on money borrowed, at the rate of six per cent. per annum, is payable monthly. Building societies are of two chief kinds, either confined to a certain number of members, or permanent and not confined to any definite number of members, but ready to receive new members as long as the society exists. These series societies, by the admission of new members, have a constant supply of funds at their disposal, and are thus able to supply the demands of all the borrowers; while the security offered to investors induces many people to enter the society merely with the view of having a convenient means of depositing their savings, and not with the intention of acquiring any real estate for themselves. In the British islands, since building societies were legalized in 1836, more than \$500,000,000 has been raised by their means, and applied by their members for the acquiring of houses and lands—nearly half a million persons being assisted in buying their homes. In the United States the statistics of 1910 give as in operation 5713 societies, with over 2,000,000 members and assets of over \$850,000,000. In 1893 the number of associations was 240, assets \$37,000,000, so that there has been a large development since that date. These societies originated in and were long confined to Philadelphia, though they have now spread widely throughout the States. Besides other advantages, the building society gives to its members business training, accustoms them to invest sums of money, and thus fits them to take care of their earnings.

Buitenzorg (boi'ten-zorg; 'without care'), a favorite residential town in the island of Java, about 40 miles south of Batavia, with which it is connected by rail. It contains a fine palace of the governor-general, celebrated botanic gardens, etc. Pop. 25,000.

Bujalance (bū-hā-lan'thā), a city of Spain, Andalusia, 21 miles E. by N. Cordova; manufactures cloth and woollen fabrics, earthenware, and glass. Pop. 10,756.

Bukharest (by-ka-rest'), the capital of Roumania, situated on the Dimbovitza about 33 miles north of the Danube, in a fertile plain. It is in general poorly built, among the chief buildings being the royal palace, the National Theater, the university buildings, the National Bank, the Mint, and the Archiepiscopal church. There are

Bulandshahr

handsome public gardens. Manufactures are varied but unimportant; the trade is considerable, the chief articles being grain, wool, honey, wax, wine, hides. The mercantile portion of the community is mostly foreign, and the whole population presents a curious blending of nationalities. Bukharest became the capital of Wallachia in 1665, in 1862 that of the united principalities of Wallachia and Moldavia, since known as Rumania. A treaty was concluded here in 1812 between Turkey and Russia, by which the former ceded Bessarabia and part of Moldavia; another treaty in 1886 between Servia and Bulgaria; and in 1913 the treaty between the several Balkan states. See *Balkan War*. Pop. 338,109.

The capture of the city formed the culmination of one of the most soundly conceived and brilliantly executed feats of strategy of the European war. The place was held to be extremely well defended by its outlying works, which comprised eighteen fortifications of the first class and many redoubts and batteries. Aside from Paris, it was accounted as probably the largest military camp in the world, one capable of accommodating 200,000 men. The Teutonic armies converged upon it from three directions, broke the Rumanian line in a great battle on December 3, 1916, and after a brief bombardment drove the defenders from their works. Bucharest constituted the fourth Entente capital taken by the Central Powers, the others being the capitals of Belgium, Servia and Montenegro. As in Belgium, a severe penalty amounting to \$133,000,000 was exacted from the Rumanian capital. See *European War*.

Bukovina (bū-ko-vē'nā), an Austrian duchy, forming the S.E. corner of Galicia. Area, 4035 sq. miles; pop. (1900) 729,921. It is traversed by ramifications of the Carpathians, and much of the surface is occupied with swamps and forests. The principal crop is maize. Much fruit is grown. Chief town, Czernowitz.

Bulacan (by-la-kān'), a town of the Philippines, island of Luzon, about 22 miles N. W. of Manila; chief industries: sugar-boiling and the manufacture of silken mats. Pop. 11,589.

Bulama, or **BOLAMA** (bū-lā'mā), an island on the W. coast of Africa, one of the Bissagos (which see).

Bulandshahr (by-land-shār'), a district of British India, Northwestern Provinces, forming a portion of the Doab, or alluvial plain inclosed between the Ganges and the Jumna. Cotton, indigo, sugar, etc., form the chief products of the district. Area, 1899 sq. miles. The town *Buland*

star, the administrative headquarters of the district, has a pop. of about 15,000.

Bulau (bu'la), or *Tikus*, an animal of the mole family (*Talpidae*) and genus *Gymnura* (*G. Rafflesii*), a native of Sumatra and Malacca, bearing a considerable resemblance to the opossum. The muzzle is much prolonged, the fur pierced by a number of long hairs or bristles, the tail naked, and it is possessed of glands which secrete a kind of musk.

Bulb, a modified leaf-bud, formed on a plant upon or beneath the surface of the ground, emitting roots from its base and producing a stem from its center. It is formed of imbricated scales or of concentric coats or layers. It encloses the rudiments of the future plant and a store of food to nourish it. Examples of bulbs are the onion, lily, hyacinth, etc.

Bulbul (bul'bul), the Persian name of the nightingale, or a species of nightingale, rendered familiar in English poetry by Moore, Byron, and others. The same name is also given in Southern and Southwestern Asia to sundry other birds.

Bulgaria (bul-gä'ri-a), a principality constituted by the treaty of Berlin, and placed under the suzerainty of the sultan of Turkey, to whom it was made tributary; but rendered independent by the Treaty of London, 1913. It is bounded north by Roumania, east by the Black Sea and European Turkey, south by the Aegean Sea and Greece, and west by Serbia. The principal towns are Widin, Sofia, Plevna, Sistova, Tirnova, Rustchuk, Shumla, Varna, and Silistria. The country almost wholly belongs to the north slope of the Balkans, and is intersected by streams flowing from that range to the Danube. It possesses much good agricultural land and a good climate; but cultivation is backward, though the rearing of cattle and horses is successfully carried on. Agricultural produce is exported, manufactured goods imported. Education is backward, but is improving; four years' school attendance is obligatory in principle. The prevalent religion is that of the Greek Church. In accordance with the terms of the Treaty of Berlin a constitution was drawn up for the new principality by an assembly of Bulgarian notables at Tirnova in 1879. By this constitution the legislative authority is vested in a single chamber, called the Sobranje or National Assembly, the members of which are partly elected by universal manhood suffrage, partly nominated by the prince. On the 29th of April, 1879, Prince Alexander of Battenberg, cousin of the Grand-duke of Hesse, was elected prince by unanimous vote of the constituent assembly. In 1885 a national rising took place in Eastern Rumelia, the Turk-

ish governor was expelled, and union with Bulgaria proclaimed. In consequence Serbia demanded an addition to her own territory and began a war against Bulgaria (Nov., 1885), in which she was severely defeated. By the treaty which followed the Prince of Bulgaria was appointed governor-general of Eastern Rumelia for a term of five years, to be renominated at the end of that time by sanction of the great powers. These events greatly irritated Russia, whose agents managed to seduce certain regiments of Bulgarian and in August, 1886, the prince was seized and carried off, while a proclamation was issued to the effect that he had abdicated. When he was set free on Austrian territory he discovered that the people were still with him, and determined to return. Seeing, however, that his presence would cause an immediate interference on the part of Russia he formally abdicated Sept. 7, 1886. In 1887 Prince Ferdinand of Saxe-Coburg came to the throne, and on Oct. 5, 1908, declared the state independent of Turkish control. In 1913 Bulgaria joined the other Balkan States in a war against Turkey, and throughout the war it was Bulgaria who was leader. See *Balkan War*. By the war Bulgaria materially extended her boundaries and power. The population in 1913 was 2,744,283; in 1914, 4,800,000. On October 14, 1915, during the European war (q. v.), Bulgaria declared war on Serbia; other declarations followed. Bulgarians successfully invaded Serbia, capturing Uskub, October 20, and Nis, November 7. In September, 1918, Serbian forces, with the aid of the French and British, attacked the Bulgarians, forcing the latter to a retreat that ended in disaster. Bulgaria sued for peace and hostilities ceased September 30. Bulgaria's losses were 101,224 killed and missing; 1,152,399 wounded, and 10,825 prisoners. Czar Ferdinand abdicated October 4, naming his son Boris his successor.

Bulgarians (bul-gä'ri-ans), a race of Finnish origin, whose original seat was the banks of the Volga and who subdued the old Moesian population and established a kingdom in the present Bulgaria in the 7th century. They soon became blended with the conquered Slavs, whose language they adopted. In the 14th century the country was conquered by the Turks, and until recently remained part of the Ottoman Empire. (See *Bulgaria*.) Bulgarian language is divided into two dialects, the old and the new; the former is the richest and best of the Slav tongues, and although extinct as a living tongue is still used as the sacred language of the Greek Church. The

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Bulkhead (bulk'hed), a partition built between portions of the interior of a ship, to separate it into rooms, or as a safeguard in case of wreck.

Bull (bul; Lat. *bullo*, a boss, later a leaden seal), a letter, edict, or rescript of the pope, published or transmitted to the churches over which he is head, containing some decree, order, or decision, and in many cases having a leaden seal attached, impressed on one side with the heads of St. Peter and St. Paul, on the other with the name of the pope. The document is in Latin and on parchment.

Bull, the name given to the male of any bovine quadruped. This word is also given to an amusing incongruity in speech, usually applied specially to the Irish people.

Bull, John, the English nation personified, and hence any typical Englishman: first used in Arbuthnot's satire, *The History of John Bull*, designed to ridicule the Duke of Marlborough; and in which the French are personified as *Lewis Baboon*, the Dutch as *Nicholas Frog*, etc.

Bull, Ole Bornemann, a famous violinist, born at Bergen, Norway, in 1810; died in 1880. He secured great triumphs both throughout Europe and in America by his wonderful playing. He lost all his money in a scheme to found a colony of his countrymen in Pennsylvania, and had to take again to his violin to repair his broken fortunes. He afterwards settled down at Cambridge, Mass., and had also a summer residence in Norway, where he died.

Bulla (bul'a), or **BUBBLE SHELL**, a genus of gasteropod molluscs with very thin and almost globular shells. There are numerous species, fossil and living.

Bullace (bul'as), a kind of wild plum (*Prunus insititia*) common in many parts of England and naturalized in Massachusetts, used for making jam, etc.

Bullæ (bul'le), or **BLEBS**, collections of serous fluid of considerable size, which gather under the cuticle and separate it from the true skin. The most familiar examples are the 'blisters' produced on the hands by rowing and on the feet by walking. They appear in various forms of skin disease.

Bull-baiting, the barbarous sport of setting dogs on a bull, who is tied to a stake and worried by the dogs for the amusement of the spec-

tators. It was a favorite sport in England from a very early period till it was finally put down by act of parliament in 1835.

Bull'dog, a variety of the common dog, remarkable for its short, broad muzzle, and the projection of its lower jaw, which causes the lower front teeth to protrude beyond the upper. The head is massive and broad; the lips are thick and pendulous; the ears pendent at the extremity; the neck robust and short; the body long and stout; and the legs short and thick. The bulldog is a slow-motioned, ferocious animal, better suited for savage combat than for any purpose requiring activity and intelligence. For this reason it is often employed as a watchdog. It was formerly used—as its name implies—for the barbarous sport of bull-baiting.—The *bull terrier* was originally from a cross between the bulldog and the terrier. It is smaller than the bulldog, lively, docile, and very courageous.

Bullen, Anne. See *Boleyn*.

Bul'ler, Sir Redvers Henry, a British soldier, born in Devonshire in 1839. He entered the army in 1858, rising in rank from lieutenant in 1862 to lieutenant-general in 1891. He served in all the wars from 1860 onward, and defeated the Arabs at Abu Klea, in the Sudan, in 1885. In 1890 he succeeded Lord Wolseley as adjutant-general of the army. In 1899 he took command of the forces in the Boer war, but being defeated at Tugela River, Natal, was superseded by Lord Roberts. Died in 1908.

Bullet (bul'et), in modern usage a projectile partially encased in a metallic cartridge and fired from a rifle or pistol. Present-day military practice has resulted in the adoption of an elongated bullet composed of a lead core cased in a harder metal, such as nickel. The diameter of the bullet is small, as is exemplified in the service rifle of the British army, the Lee-Enfield, which has a diameter of .303 in., weighs 215 grains and is coated with Cupro-nickel. The bullet used in the United States army is the Spitzer, a sharp-pointed bullet, .308 in. diameter, weighing 150 grains. The bullet used in sporting rifles is much the same as that used in the military arm. The type used in the Express rifle had a hollow point to insure the expansion of the projectile on impact, and in this rifle particularly the bullets were sometimes filled with a detonating powder. Their use is now abandoned and is prohibited in warfare by international law. The dumdam bullet, named from the Dumdam

ammunition works at Calcutta, was a half-covered bullet with an expansible soft core. The soft-nose bullet is one in which the nose is made of softer metal than the rest, so that it flattens out or mushrooms on impact.

Bulletin (bul'e-tin), an authenticated official report concerning some public event, such as military operations, or the health of a distinguished personage, issued for the information of the public.

Bullet-tree, or **BULLY-TREE** (*Mimosa*, *sops balata* or *Sapota Mulleri*), a forest tree of Guiana and neighboring regions, order Sapotaceae, yielding an excellent gum (the concentered milky juice) known as *balata*, having properties giving it in some respects an intermediate position between gutta-percha and India rubber, and making it for certain industrial purposes more useful than either. In the United States it is used as a chewing material. The timber of the tree also is valuable.

Bull-fights are among the favorite diversions of the Spaniards. They are usually held in an amphitheater having circular seats rising one above another, and are attended by vast crowds who eagerly pay for admission. The combatants, who make bullfighting their profession, march into the arena in procession. They are of various kinds—the *picadores*, combatants on horseback, in the old Spanish knightly garb; the *chulos* and *banderilleros*, combatants on foot, in gay dresses, with colored cloaks or banners; and finally, the *matador* (the killer). As soon as the signal is given the bull is let into the arena. The *picadores*, who have stationed themselves near him, commence the attack with their lances, and the bull is thus goaded to fury. Sometimes a horse is wounded or killed (only old, worthless animals are thus employed), and the rider is obliged to run for his life. The *chulos* assist the horsemen by drawing the attention of the bull with their cloaks; and in case of danger they save themselves by leaping over the wooden fence which surrounds the arena. The *banderilleros* then come into play. They try to fasten on the bull their *banderillas*—barbed darts ornamented with colored paper, and often having squibs or crackers attached. If they succeed, the squibs are discharged, and the bull races madly about the arena. The *matador* or *espada* now comes in gravely with a naked sword, and a red flag to decoy the bull with, and aims a fatal blow at the animal. The slaughtered bull is dragged away, and another is let

out from the stall. Several bulls are disposed of in a single day.

Bull'finch, or **BULFINCH**, an intricate bird, *Pyrrhula cilla*, family Fringillidae, or finches, short, thick, rounded bill, beak and of the head black, body bluish-gray and bright tile-red below. It is found in the middle and south of Europe, Asia, and when tamed may be taught singing musical airs. *P. synoica* is an Asiatic species, and *P. cineriosa* an inhabitant of Brazil.

Bull'frog, the *Rana pipiens*, a species of frog found in North America, 8 to 12 inches long, dusky-brown color mixed with a yellowish green, and spotted with black. The frogs live in stagnant water, and utter a low croaking sound resembling the bellowing of cattle, whence the name.

Bull'head, the popular name of certain fishes. One of the *Cottus gobio*, an European fish, about 4 inches long, with head very broad and broader than the body. It is called also *Miller's thumb*. The bullhead is the *Aspidophorus Euro-* found in the Baltic and northern seas. The six-horned bullhead (*O. hexacornis*) is a North American species. In America this name is given to a species *Pimelodus*, called also *catfish* and *hempstock*.

Bullinger (bul'ing-er), HENRI, a celebrated Swiss reformer, born in 1504; died at Zurich in 1561. He was the intimate friend of Zuingli, whom he succeeded in 1531 as pastor of Zurich. He kept up a close correspondence with the principal English reformers. The *Zurich Letters*, published by the Parker Society, contains part of this correspondence, and among other letters addressed to him by Lady Grey. He wrote numerous theological works.

Bullion (bul'yun) is uncoined gold or silver, in bars, plate, or masses, but the term is frequently employed to signify the precious metals coined and uncoined.

Bull Run, a stream in the Northern Virginia, flowing into the Occoquan river, 14 miles from the Potomac; the scene of two great battles during the Civil War in which the Federals were defeated—one, July 21, 1861, the other August 29-30, 1862. By the Confederates these battles were called Manassas after a near-by railway junction.

Bulls and Bears, in stock-exchange slang, manipulators of stocks; the former operating in order to effect a rise in price, the latter

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Bull's-eye

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Bull's-eye, (1) a round piece of thick glass, convex on one side, inserted into the decks, ports, scuttle-hatches, or skylight-covers of a vessel for the purpose of admitting light. (2) A small lantern with a lens in one side of it to concentrate the light in any desired direction. (3) In rifle shooting, the center of a target, of a different color from the rest of it and usually round. (4) In architecture, a round window, usually in a mansard roof.

Bull-trout, a large species of fish of the salmon family, the *Salmo eriox*, thicker and clumsier in form than the salmon, but so like it as sometimes to be mistaken for it by fishers. It attains a weight of 15 to 20 lbs., and lives chiefly in the sea, ascending rivers to spawn. Its scales are smaller than those of the salmon, and its color less bright.

Bully-tree. See *Bullet-tree*.

Bülow (bü'lō) BERNHARD VON, COUNT, born in Germany in 1850, son of Herr von Bülow, foreign secretary under Bismarck 1873-79. He was successively secretary of embassy at Rome, St. Petersburg, and Vienna and chargé d'affaires in Greece; was appointed Minister to Roumania in 1888, to Italy in 1893, foreign secretary in 1897, and minister for foreign affairs in 1898. In 1900 he was appointed chancellor of the empire, holding this position until 1909.

Bülow, FRIEDRICH WILHELM VON, a Prussian general, born in 1755; died in 1816. He was actively engaged against the French at the earliest periods of the revolutionary war; and his services in 1813 and 1814, especially at Grosbeeren and Dennewitz, were rewarded with a Grand Knighthip of the Iron Cross and the title Count Bülow von Dennewitz. As commander of the fourth division of the allied army he contributed to the victorious close of the battle of Waterloo.

Bülow, HANS GUIDO VON, pianist and composer, born at Dresden in 1830; was intended for a lawyer, but adopted music as a profession. He studied the piano under Liszt, and made his first public appearance in 1852. In 1855 he became the leading professor in the conservatory at Berlin; in 1858 was appointed court pianist; and in 1867 was made musical director to the King of Bavaria. His compositions include overture and music to *Julius Caesar*, *The Minstrel's Curse*, and *Nirvana*; songs, choruses, and pianoforte pieces. He is considered one of the first of pianists and

Bummalo

orchestral conductors, but was very irascible. He died in 1894.

Buloz (bü-loz), FRANÇOIS, born near Geneva, Switzerland, in 1803; died at Paris in 1877; founder and editor of the *Revue des Deux Mondes*, the celebrated French fortnightly literary magazine.

Bulrampur (bai-rām-pur'), a town of Oude, India; the largest town in the Gonda district, and the residence of the Maharajah of Bulrampur. Pop. about 15,000.

Bulrush (bul'rush), the popular name for large rush-like plants growing in marshes, not very definitely applied. Some authors apply the name to *Typha latifolia* and *T. angustifolia* (cat's-tail or reed-mace). But it is more generally restricted to *Scirpus lacustris*, a tall, rush-like plant from which the bottoms of chairs, mats, etc., are manufactured. The bulrush of Egypt (Ex. ii, 3) is the *Juncus globulosus*.

Bulsar (bul-sär'), a port and town in Surat district, Bombay, on the estuary of the Auranga. Exports timber, and manufactures cloth, bricks, tiles, and pottery. Pop. 13,229.

Bulund'shahur. See *Bulandshahr*.

Bulwark (bul'wark), an old name for a rampart or bastion.

Bulwer (bul'wér), SIR HENRY LYTTON, LORD DALLING and BULWEN, diplomatist and author, elder brother of Lord Lytton; born in 1804; died in 1872. He was attached to the British embassies at Berlin, Brussels, and the Hague from 1827 to 1830, when he entered parliament. In 1837 he was sent as secretary of legation to Constantinople; subsequently he was minister at Madrid and Washington, and he succeeded Lord Stratford de Redcliffe as ambassador at the Porte (1858-65). He wrote *France, Social, Literary and Political*; *Life of Byron*; *Life of Palmerston*; *Historical Characters*, etc. He was raised to the peerage in 1871.

Bulwer Lytton. See *Lytton, Lord*.

Bum'ble-Bee. See *Bee*.

Bumboat, a small boat used to sell vegetables, etc., to ships lying at a distance from shore.

Bummalo (bum'a-lō), BUMMALO'TI, the Indian name for a small, glutinous, transparent fish, about the size of a smelt, found on the coasts of Southern Asia, which, when dried, is much used as a relish by both Europeans and Indians and facetiously called *Bombay duck*. It is the *Saurus ophiodon*, family Scopelidae.

Buncombe, BUNKUM (bung'kum), a county in North Carolina; area 624 sq. m. Pop. 49,795. The term *Bunkum*, meaning talking for talking's sake, bombastic speech-making, originated in the 16th Congress, when the 'Missouri Question' was being discussed. Felix Walker, congressman from Buncombe County, persisted in making a speech when the house was impatient to vote. When implored to desist he declared that he was only talking for *Buncombe*, whence the term.

Bundelcund (bun-del-kund'; more correctly BUNDEL-KHAND), a tract of country in Upper India lying between the river Jumna on the N., and the Chambal on the N. and W.; area 20,559 sq. m. It comprises the British districts of Hamirpur, Jalaun, Jhānsi, Lalitpur, and Banda, and thirty-one native states. In it are the diamond mines of Punnah.

Bunder-Abbas. See *Bender-Abbas*.

Bundesrath (bun'des-rät), the German federal council which represents the individual states of the empire, as the *Reichstag* represents the German nation. It consists of sixty-two delegates, and its functions are mainly those of a confirming body, although it has the privilege of rejecting measures passed by the *Reichstag*.

Bundi (bün'di). See *Boondee*.

Bungalow (bung'a-lö), in India, a house or residence, generally of a single floor. Native bungalows are constructed of wood, bamboos, etc.; but those erected by Europeans are generally built of sun-dried bricks, and



Bungalow on Penang Hills.

thatched or tiled, and are of all styles and sizes, but invariably surrounded by a veranda. Within recent years the building of similar rustic dwellings, for summer resort, has become common in the United States.

Bungay (bung'gä), a market town of England, County Suffolk, on

the right bank of the Waveney, 30 miles N. E. of Ipswich. It contains the ruins of an ancient castle, a stronghold of the Bigods, earls of Norfolk. Pop. (1911) 3359.

Bunion (bun'yun), an enlargement and inflammation of the joint of the great toe arising from irritation to the small membranous sac called *bursa mucosa*.

Bu'nium. See *Earthnut*.

Bunk, a wooden box or case serving as a seat during the day and a bed at night; also one of a series of sleeping berths arranged above each other.

Bunk'er Hill, a small eminence in Charlestown, now a part of Boston, Massachusetts; the scene of the first important battle in the Revolutionary war, fought June 17, 1775. A considerable body of Americans having been sent to occupy the peninsula on which Charlestown stands, a British force was sent to dislodge them. This was not effected till after three assaults on their intrenched position, with a loss of 1000 men, while the Americans did not lose half that number.

Bun'kum. See *Buncombe*.

Bunsen (bun'sen), CHRISTIAN KARL JOSEPH, CHEVALIER, a distinguished German diplomatist and scholar, was born at Korbach, in the principality of Waldeck, in 1791; died in 1860. In 1815 he made the acquaintance of Niebuhr, who shortly after procured for him the post of secretary to the Prussian embassy at Rome. In 1824 he was appointed chargé d'affaires, and afterwards minister. After a stay of twelve years in Rome he was sent, as Prussian minister, first to Switzerland, and then to England, where he remained till the breaking out of the Eastern difficulty in 1854. In his official capacity he won the esteem of all, and with Britain especially he was connected by many ties. His later years were spent at Heidelberg and at Bonn exclusively in literary pursuits. Among his best-known works are *Die Verfassung der Kirche der Zukunft* ('The Constitution of the Church of the Future'), Hamburg, 1845; *Aegypten's Stelle in der Weltgeschichte* ('Egypt's Place in the World's History'), Hamburg, 1845; *Hippolytus und seine Zeit* ('Hippolytus and his Time'), London, 1851, and finally, his greatest work, *Bibelwerk für die Gemeinde* ('Bible Commentary for the Community'), the publication of which was unfinished at his death. His *Memoirs*, by his widow, were published in 1868.

Bunsen, ROBERT WILHELM EBERARD, an eminent German chemist, born at Göttingen in 1811; died in 1899. He studied at Göttingen University, and at Paris, Berlin, and Vienna; was appointed professor at the Polytechnic Institute of Cassel, 1836; at the University of Marburg in 1838, at Breslau in 1851, and finally professor of Experimental Chemistry at Heidelberg in 1852. Among his many discoveries and inventions are the production of magnesium in quantities, magnesium light, spectrum analysis, and the electric pile and burner bearing his name.

Bunsen's Battery, a form of galvanic battery, the cells of which consist of cleft cylinders of zinc immersed in dilute sulphuric acid, and rectangular prisms of carbon in nitric acid, with an intervening porous cell of unglazed earthenware.

Bunsen's Burner, a form of gas burner especially adapted for heating, consisting of a tube, in which, by means of holes in the side, the gas becomes mixed with air before consumption, so that it gives a non-illuminating smokeless blue flame.

Bunt, sometimes called *Smut Ball*, *Pepper Brand*, and *Brand Bladders*, a fungoid disease incidental to cultivated corn, consisting of a black, powdery matter, having a disagreeable odor, occupying the interior of the grain of wheat and a few other Gramineæ. This powdery matter consists of minute balls filled with sporules, and is caused by the attack of *Tilletia caries*, a kind of mold.

Bunter Sandstein (bun'ter zant'shtin; 'variegated sandstone'), a German name for the new red sandstone, the lowest group of the Triassic system.

Bunt'ing, the popular name of a family Emberizidæ, chiefly included in the genus *Emberiza*; such as the English or common bunting; the rice-bunting; the Lapland, snow, blackheaded, yellow, girl, and ortolan buntings. The yellow bunting or yellow hammer (*E. citrinella*) is one of the most common British birds. The common or corn bunting (*E. miliaria*) is also common in cultivated districts. The snow-bunting (*Plectrophenax nivalis*) is one of the few birds which cheer the solitudes of the polar regions.

Bunt'ing, a thin woolen stuff, of which the colors and signals of a ship are usually formed; hence, a vessel's flags collectively.

Bun'ya-Bun ya, the native Australian name of the *Arcauria Bidwillii*, a fine Queensland tree with cones larger than a man's head, containing seeds that are eagerly eaten by the blacks.

Bun'yan, JOHN, author of *The Pilgrim's Progress*, was the son of a tinker, and was born at the village of Elstow, near Bedford, in 1628; died at London in 1688. He followed his father's employment, but during the civil war he served as a soldier. Returning to Elstow, after much mental conflict his mind became impressed with a deep sense of the truth and importance of religion. He joined a society of Anabaptists at Bedford, and at length undertook the office of a public teacher among them. Acting in defiance of the severe laws against dissenters, Bunyan was detained in prison for twelve years (1660-72), but was at last liberated, and became pastor of the community with which he had previously been connected. During his imprisonment he wrote *Profitable Meditations*, *The Holy City*, etc., and also the curious piece of autobiography entitled *Grace Abounding to the Chief of Sinners*. In 1675 he was sent to prison for six months under the Conventicle Act. To this confinement he owes his chief literary fame, for in the solitude of his cell he produced the first part of that admired religious allegory, the *Pilgrim's Progress*. His *Holy War*, his other religious parables, and his devotional tracts, which are numerous, are also remarkable, and many of them valuable. On obtaining his liberty Bunyan resumed his functions as a minister at Bedford, and became extremely popular. He died when on a visit to London.

Bunzlau (bunts'lou), a town of Prussia, province of Silesia, 28 miles W. of Liegnitz. Industries: woolen and linen, pottery. Pop. 14,590. — *Jung-Bunzlau* is a town of Bohemia, 81 miles N. E. of Prague, with 16,940 inhabitants. There is a smaller Bohemian town called *Alt-Bunzlau*.

Buonaparte. See *Bonaparte*.

Buonarroti (by-o-nâr-rot's), **MICHAEL ANGELO**, of the ancient family of the counts of Canossa, born at Caprese, Tuscany, in 1475; died at Rome in 1563; a distinguished Italian painter, sculptor, architect, and poet. He studied drawing under Domenico Ghirlandaio, and sculpture under Bertoldo at Florence, and having attracted the notice of Lorenzo de' Medici, was for several years an inmate of his household. Having distinguished himself both in sculpture and

painting, he was commissioned (together with Leonardo da Vinci) to decorate the senate-hall at Florence with a historical design, but before it was finished, in 1505, he was induced by Pope Julius II to settle in Rome. Here he sculptured the monument of the pontiff (there are seven statues belonging to it) now in the church of St. Pietro in Vincoli; and painted the dome of the Sistine Chapel, his frescoes representing the creation and



Michael Angelo Buonarroti

the principal events of sacred history. In 1530 he took a leading part in the defense of Florence against Charles V. Three years later he began his great picture in the Sistine Chapel, the *Last Judgment*, which occupied him eight years. His last considerable works in painting were two large pictures: the *Conversion of St. Paul* and the *Crucifixion of St. Peter* in the Pauline Chapel. In sculpture he executed the *Descent of Christ from the Cross*, four figures of one piece of marble. His statue of *Bacchus* was thought by Raphael to possess equal perfection with the masterpieces of Phidias and Praxiteles. As late as 1546 he was obliged to undertake the continuation of the building of St. Peter's and planned and built the dome, but he did not live long enough to see his plan finished, and many alterations were made in it after his death. Besides this, he undertook the building of the Piazza del Campidoglio (Capitol), of the Farnese Palace, and of many other edifices. His style in architecture is distinguished by grandeur and boldness, and in his ornaments the untamed character of his imagination frequently appears, he preferring the uncommon to the simple and elegant. His poems, which he considered merely as pastimes, contain, likewise, convincing proofs of his great genius. His prose works consist of lectures, speeches, etc.

Buoy (boi), any floating body employed to point out the particular situation of a ship's anchor, a shoal, the direction of a navigable channel, etc. They are made of wood, or now more commonly of wrought-iron plates riveted together and forming hollow chambers. They are generally moored by chains to the bed of the channel, etc. They are of various shapes, and receive corresponding names: thus there are the *can-buoy*, the *spar-buoy*, the *bell-buoy*, the *whistling-buoy*, etc. Gas-lighted buoys have come into use with the introduction of calcium carbide for lighting purposes. The acetylene gas produced in these buoys is controlled by an automatic generator, so that all the carbide of a given charge is consumed.

Buphaga (bū'fa-ga), a genus of insectivorous African birds, family Sturnidæ (starlings). See *Beef-eater*.

Buprestidæ (bū-pres'ti-dē), a family of beetles, distinguished by the uncommon brilliant and highly metallic splendor of their colors.

Burbage (bur'ba-j), RICHARD, a famous actor and contemporary of Shakespeare, was the son of James Burbage (died 1597), also an actor, and the first builder of a theater in England. He was born about 1567; died in 1633. He was a member of the same company as Shakespeare, Fletcher, Hemming, Cresswell, and others, and filled all the great parts of the contemporary stage in his time. He was the original *Hamlet*, *Richard III*, and played the leading parts in the plays of Ben Jonson, Webster, Marston, etc. Besides being an eminent actor, he seems to have been also a successful painter in oil colors.

Burbank, LUTHER, horticulturist, born at Lancaster, Massachusetts, in 1849. The son of a farmer, he became deeply interested in plants and engaged in experiments on hybridization of plants. Removing to California, he established the Burbank Extension Farms at Santa Rosa, where he undertook the work of cross-breeding on an extended scale. He originated a new fruit, the plumcot, by combining plum and the apricot, produced an edible thornless cactus, developed the Burbank potato and Burbank cherry, varieties of great excellence; a white blackberry, various new apples, stoneless peaches, also new peaches, nuts, roses, and violet-odored lilies, and many other varieties. In 1905 the Carnegie Foundation granted him \$10,000 yearly stipendium to continue his work. He has made very many extensive experiments

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way and has nearly 8000 distinct botan-
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Burbot (bur'bot), or BURBOLT, a fish
of the cod family, genus *Lota*
(*L. vulgaris*), shaped somewhat like an
eel, but shorter, with a flat head. It
has two small barbs on the nose and an-
other on the chin. It is called also *Eel-*
pout or *Coney-fish*, and is said to arrive
at its greatest perfection in the Lake of
Geneva. It is delicate food. The spotted
burbot is found in the northern lakes
and rivers of N. America.

Burckhardt (burk'hart), JOHANN
LUDWIG, a noted
traveler, born at Lausanne in 1784; died
at Cairo in 1817. He undertook a journey
of exploration to the interior of Africa
for the African Association in 1809, as-
suming an Oriental name and costume;
spent some time in Syria, thence visited
Egypt and Nubia; spent several months
at Mecca, and visited Medina; and after
a short stay in Egypt died at Cairo while
preparing for his African journey. His
works are: *Travels in Nubia* (1819);
Travels in Syria and the Holy Land
(1822); *Travels in Arabia* (1829);
Notes on the Bedouins and Wahabys
(1830); and *Arabic Proverbs* (1831).

Burdekin (bur'de-kin), a river of the
N. E. of Queensland, with a
course of about 350 miles. With its
affluents it waters a large extent of
country, but it is useless for navigation.

Burdett (bur'det), SIR FRANCIS, an
English politician, born
in 1770, died in 1844. In 1796 he entered
parliament as member for Boroughbridge,
and advocated parliamentary reform and
various liberal measures. He afterwards
sat for Middlesex and in 1807-37 for
Westminster. In 1810 he was convicted
of breach of privilege, and after a
struggle between the police and the
populace, in which some lives were lost,
he was imprisoned in the Tower. In
1819 he was again imprisoned, and fined
£2000 for a libel. In his later years he
became a Tory, and represented North
Wilts. In 1793 he married the youngest
daughter of Thomas Coutts the banker.

Burdett-Coutts (koots), ANGELA
GEORGINA, daugh-
ter of the above, born in 1814, became
deservedly popular for the liberal use she
made of the immense wealth she inherited
from her grandfather (Thomas Coutts)
in public and private charities. In 1871
she received a peerage from the govern-
ment, and in 1881 married a Mr. Ashmead-
Bartlett, who assumed the name of
Burdett-Coutts. She died in 1906.

Bur'dette, ROBERT JONES, humorist,
born at Greensborough,

Pennsylvania, in 1844. He was in the
Union army 1862-65, became an editor
on the Burlington *Hawkeys* and later on
the Brooklyn *Eagle*. In 1887 he was
ordained a Baptist clergyman and in 1903
he was called to an important charge in
Los Angeles, California. His humorous
productions took the form of magazine
contributions, lectures, and speeches. He
died November 19, 1914.

Burdock (bur'dok), the popular
name of the composite
plant *Arctium lappa*, a coarse-looking
weed with globose flower-heads, the scales
of the involucre each furnished with a
hook. Burdocks are usually regarded as
troublesome weeds, but in some countries
the roots, young shoots, and young leaves
are used in soups, and the plant is culti-
vated with this view in Japan. It is com-
mon in the United States.

Burdwan (burd'-wän). See *Bardwan*.

Bureau (bü'rö), in the United States
a chest of drawers; in France
a writing table or desk; also a government
department. In the United States the
term signifies certain subdivisions of an
executive department, as the bureau of
statistics, a division of the treasury de-
partment. *Bureaucracy* is a term applied
to those governments in which the busi-
ness of the administration is carried on
by departments, each under the control
of a chief, responsible to his administra-
tive superior but not amenable to the
common law of the land.

Bureau OF PAN-AMERICAN UNION,
formerly the International Bu-
reau of American Republics. A bureau
established at Washington as an outcome
of the Pan-American Conference of 1890,
its purpose being to keep the republics of
this continent in close touch with one
another in regard to commercial and other
interests, and thus promote fraternal re-
lations between them.

Burette (bü-ret'), a glass tube usually
graduated to fractions of a
centimeter, used for dividing a given por-
tion of any liquid into small quantities of
a definite amount or to gauge the amount
of liquid to be allowed to enter another
liquid; used in chemical work.

Burg (börg), a town of Prussia, prov-
ince of Saxony, 14 miles N. E. of
Magdeburg. It has cloth manufactures,
boot industries, etc. Pop. 22,434.

Burgage Tenure (bur'gaj), in Eng-
land a tenure in
socage, whereby burgesses, citizens, or
townsmen hold their lands or tenements
of the king or other lord for a certain
yearly rent. In Scotland the term indi-
cates that tenure by which the property in
royal burghs is held under the crown,

proprietors being liable to the (nominal) service of watching and warding, or, as it is commonly termed, 'service of burgh, used and wont.'

Burgas (bur-gäs), or BOURGAS, a town on the Black Sea, in Eastern Rumelia. Pop. 11,073.

Burger (bür'gér). GOTTFRIED AUGUST, a celebrated German poet, born Jan. 1, 1748; died in 1794. He studied at Halle and Göttingen; and his attention being drawn towards literature, especially the ballad literature of England and Scotland, he was inspired with the idea of winning a reputation in this department where Uhland and Schiller had already preceded him. In 1773 appeared his *Lenore*, which took the German public by storm, and his poems have continued to be very popular with his countrymen. Scott translated his *William and Helen* and the *Wild Huntsman*. Though he wrote odes, elegies, etc., he is more at home in ballads and simple songs than in higher poetry. His life was not a successful or a happy one.

Burgess (bur'jes), a magistrate of a borough. In Pennsylvania a burgess for a borough performs the same duties as a mayor for a city.

Bur'gess, JAMES, an English archaeologist, born in 1832. In 1855 he became professor of mathematics at Calcutta. He was appointed director of the archaeological survey of Western India in 1873 and of all India in 1886. He published a number of superbly illustrated volumes on *The Rock Temples of Elephanta*, *The Cave Temples of India*, *Mohammedan Architecture of Gujarat*, etc.

Burgh (bur'ö), the Scotch term corresponding to the English 'borough' and applied to several different kinds of town corporations. A *royal burgh* is a corporate body erected by a charter from the crown. The corporation consists of the magistrates and burgesses of the territory erected into the burgh. The magistrates are generally a provost and bailies, dean of guild, treasurer, and common council. The royal burghs now number sixty-six, most of them singly or in groups electing parliamentary representatives, though others have lost this privilege.—*Burghs of Barony* are corporations analogous to royal burghs, the magistrates of which are elected either by the superior of the barony or by the inhabitants themselves, according to the terms of the charter of erection.—*Burghs of Regality* were a kind of burghs of barony which had regal or exclusive jurisdiction within their own territory till the abolition of hereditary

jurisdictions.—*Parliamentary Burghs* are such as, not being royal burghs, send representatives to parliament. There are fifteen of these, namely, Airdrie, Crumarty, Falkirk, Galashiels, Greenock, Hamilton, Hawick, Kilmarnock, Leith, Musselburgh, Oban, Paisley, Peterhead, Port-Glasgow, and Portobello. The mode of election of councillors and magistrates of parliamentary burghs is the same as of royal burghs.—*Police Burghs* are populous places, the boundaries of which are settled in terms of the Police Act 1862, and the affairs of which are managed by commissioners elected under the act by the inhabitants.

Burghers (bur'gèrs), a body of Presbyterians in Scotland, constituting the majority of the early Session Church, which was split into two in 1747 on the lawfulness of accepting the oath then required to be taken by the burgesses in certain burghs. The Burghers accepted the oath, while Antiburghers did not deem it lawful.

Burgh'ley, BUR'LEIGH. See *Cecil*.

Burgkmair (burk'mir), a family of German artists in the 15th and 16th centuries, the best known of whom is Hans, born at Augsburg in 1472. Several of his paintings are to be seen at Augsburg, Munich, Nürnberg, etc., but these have contributed far less to his fame than his woodcuts, which are not inferior to those of his friend Albert Dürer. The most celebrated is the series of 135 cuts representing the *Triumph of the Emperor Maximilian*. He is supposed to have died in 1520.

Burglary (burg'la-ri; derived from the French *bourg*, a town, and old French *laire*, L. *latro*, a thief) is defined in law to be a breaking and entering the dwelling-house of another in the night, with intent to commit a felony within the same, whether such felonious intent be executed or not. Breaking and entering are considered necessary to constitute the offense. Laws of different countries differ in their conception of burglary. An Act of Congress of 1825 includes breaking into houses and vessels as burglary; and in the United States breaking into shops, factories, warehouses, offices, and places of worship is also included. Burglary is a felony in all the States, and in Carolina it may be punished with death or by imprisonment. In the United States, as a whole, the maximum punishment is twenty years' imprisonment.

Burgomaster (bur'gö-mas-tèr), chief magistrate of a municipal town in the Netherlands.

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Burgos (bur'gos), a city of Northern Spain, once the capital of the kingdom of Old Castile, and now the chief town of the province of Burgos. It stands on the declivity of a hill on the right bank of the Arlanzon, and has dark, narrow streets lined by ancient architecture, but there are also fine promenades in the modern style. The cathedral, commenced in 1221, is one of the finest examples of Gothic architecture in Spain. It contains the tombs of the famous Cid and of Don Fernando, both natives of Burgos, and celebrated throughout Spain for their heroic achievements in the wars with the Moors. Before the removal of the court to Madrid, in the 16th century, Burgos was in a very flourishing condition, and contained thrice its present population. It has some manufactures in woollens and linens. Pop. 30,167.—The province has an area of 5650 sq. miles, largely hilly or mountainous, but with good agricultural and pastoral land. Pop. 388,828.

Burgoyne (bur'goin'), JOHN (1722-92), an English general in America. After serving in various parts of the world he was sent to America in 1777 in command of a powerful expedition, with orders to penetrate from Canada into New York state. His plan was to advance with his force of nearly 10,000 men through Lakes Champlain and George, thence to the Hudson, and down to Albany; here he was to be joined by Lord Howe (q. v.) with 20,000 troops from New York, and St. Leger (q. v.) with a smaller force, coming by way of the St. Lawrence and Oswego Rivers. Howe, it may be said here, never received proper instructions, and instead of co-operating with Burgoyne took his forces to the Chesapeake Bay on a movement against Philadelphia. Burgoyne met with no resistance till he came to Ticonderoga. It was expected that he would be held here, but Fort Ticonderoga was weak and assailable from Mount Defiance (Sugar Loaf Hill) situated across the outlet of St. George. General Arthur St. Clair, who was in command, had only about 2500 men to undertake the defense when Burgoyne, on July 5, 1777, appeared on the crest of Mount Defiance with his batteries. Ticonderoga was no longer tenable and it was given up, together with Mount Independence, a star fort across the lake. Burgoyne pushed on by slow stages to Fort Edward. Schuyler, who was in command here, abandoned the fort, which was not a strong one, and fell back to Fort Miller, six miles south, then to Saratoga, later to Stillwater and finally to the mouth of the Mohawk. Burgoyne had ex-

pected to join St. Leger at Albany, but the defeat of St. Leger at Oriskany (q. v.) upset this plan. Being in need of supplies Burgoyne dispatched Colonel Baum (q. v.) with five hundred men to Bennington (q. v.); there Baum's forces were defeated, Baum himself being mortally wounded in the battle. Colonel Breyman, who had been sent to the support of Baum, fared no better. He was savagely attacked by Stark and Colonel Seth Warner and his force practically annihilated; 207 were killed and 700 taken prisoner. Breyman and a few of his men escaped. Burgoyne himself met with disaster on his march to Albany. On September 13 he crossed the Hudson and encamped at the mouth of Fish Creek. There was some skirmishing for a few days, and on the 19th he fought what has variously been described as the battle of Freeman's Farm, the battle of Bemis Heights, the battle of Stillwater and the first battle of Saratoga. (See *Saratoga, battle of*.) Opposed to him was General Gates, who had supplanted Schuyler in command of the Northern army. Through the bravery of General Benedict Arnold the Americans were saved from defeat. Burgoyne had the larger force, but at the end of the fighting neither side had gained an advantage. On October 7 Burgoyne made a second attack, and was defeated. Nothing remained for him but retreat. His attempt to reach Canada was a failure; he was surrounded at Schuylerville (Saratoga) and forced to surrender to Gates with 5791 men. He returned to England and devoted the rest of his life to literature. He wrote several comedies, including *The Maid of the Oaks*, *Lord of the Manor*, *Bon Ton* and *The Heiress*, as well as some essays.

Burgundy (bur'gun-di), a region of Western Europe, so named from the Burgundians, a Teutonic or Germanic people originally from the country between the Oder and the Vistula. They migrated first to the region of the Upper Rhine, and in the beginning of the fifth century passed into Gaul and obtained possession of the southeastern part of this country, where they founded a kingdom having its seat of government sometimes at Lyons and sometimes at Geneva. They were at last wholly subdued by the Franks. In 879 Boson, Count of Autun, succeeded in establishing the royal dignity again in part of his kingdom. He styled himself King of Provence, and had his residence at Arles. His son Louis added the country beyond the Jura, and thus established *Cisjuran Burgundy*. A second kingdom arose when Rudolph of Stettlingen formed *Upper or Transjuran Burgundy* out of part of Switzerland

Burgundy

and Savoy. Both these Burgundian kingdoms were united, and finally, on the extinction of Rudolph's line, were incorporated with Germany. But a third state, the historical DUCHY OF BURGUNDY, consisting principally of the French province of Bourgogne or Burgundy, had been formed as a great feudal and almost independent province of France in the ninth century. This first ducal line died out with a Duke Philip, and the duchy, reverting to the crown, was, in 1363, granted by King John of France to his son Philip the Bold, who thus became the founder of a new line of dukes of Burgundy. A marriage with Margaret, daughter of Louis III, Count of Flanders, brought him Flanders, Mechlin, Antwerp, and Franche-Comté. He was succeeded by his son Duke John the Fearless, whose son and successor, Philip the Good, so greatly extended his dominions that on his death in 1467 his son Charles, surnamed the Bold, though possessing only the title of duke, was in reality one of the richest and most powerful sovereigns of Europe. (See *Charles the Bold*.) Charles left a daughter, Mary of Burgundy, the sole heiress of his states, who by her marriage to Maximilian of Austria transferred a large part of her dominions to that prince, while Louis XI of France acquired Burgundy proper as a male fief of France. Burgundy then formed a province, and is now represented by the four departments of Yonne, Côte-d'Or, Saône-et-Loire, and Ain. It is watered by a number of navigable rivers, and is one of the most productive provinces in France, especially of wines. See *Burgundy Wines*.

Burgundy Pitch, a resin obtained from the Norway spruce (*Abies excelsa*) and several other pines. It is used in medicine as a stimulating plaster. It takes its name from Burgundy in France, where it was first prepared.

Burgundy Wines are produced in the former province of Burgundy, especially in the department of Côte-d'Or, and in richness of flavor and all the more delicate qualities of the juice of the grape they are inferior to none in the world. Amongst the red wines of Burgundy the finest are the Chambertin, the Clos Vougeot, Romanée-Conty, etc.

Burhampur (bur-a-m-pŭr'). See *Berhampur*.

Burhānpur (bur-an-pŭr'), a town of India, Central Provinces, formerly the capital of Kandelish, and famous for its muslin and flowered

silk manufactures, which still exist to some extent, though the town has long been declining. Pop. 30,017.

Burial (ber-i-al), the mode of disposing of the dead, a practice which varies amongst different peoples. Amongst savage races, and even amongst some cultured peoples of the East, exposure to wild animals or birds of prey is not uncommon. The careful embalment of their dead by the ancient Egyptians may be regarded as a special form of burial. But by far the most common modes of disposing of the dead have been burning and interring. Amongst the Greeks and Romans both forms were practised, though amongst the latter burning became common only in the latter times of the republic. In this form of burial the corpse, after being borne in procession through the streets, was placed upon a pyre built of wood, and profusely sprinkled with oils and perfumes. Fire was set to the wood, and after the process of cremation was complete the bones and ashes were carefully gathered together by the relatives and placed in an urn. With the introduction of the Christian religion consecrated places were appropriated for the purpose of general burial, and the Roman custom of providing the sepulchre with a stone and inscription was continued by the Christians. The practice of cremation then declined and finally disappeared, but has recently to some little extent been revived.

Buriats (bŭ-ri-ats), a nomadic Tartar people allied to the Kalmucks, inhabiting the southern part of the government of Irkutsk and Transbaikalia. Their number is about 200,000. They live in huts called *yurts*, which in summer are covered with leather, in winter with felt. They support themselves by their flocks, by hunting, and the mechanical arts, particularly the forging of iron.

Buridan (bŭ-rē-dān), JEAN, a French scholastic philosopher of the 14th century. He was a disciple of William of Ockham at Paris, and has attained a kind of fame from an illustration he is said to have used in favor of his theory of determinism (that is, the doctrine that every act of volition is determined by some motive external to the will itself, and which still goes under the name of 'Buridan's ass.' He is said to have proposed the case of a hungry ass placed at an equal distance from two equally attractive bundles of hay, and to have asserted that in the supposed case the ass must inevitably have perished from hunger, there being nothing to determine to prefer the one bundle to the other.

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The nature of the illustration, however, makes it more likely that it was invented by Buridan's opponents to ridicule his views than by himself. Buridan died after 1358 at the age of sixty.

Burin (bū'rin), or GRAVER, an instrument of tempered steel, used for engraving on copper, steel, etc. It is of a prismatic form, having one end attached to a short wooden handle, and the other ground off obliquely, so as to produce a sharp triangular point. In working, the burin is held in the palm of the hand, and pushed forward so as to cut a portion of the metal.

Buriti (by-ré'té), a South American palm (*Mauritia vinifera*) growing to the height of 100-150 feet, preferring marshy situations, and bearing an imposing crown of fan-shaped leaves. A sweet vinous liquor is prepared from the juice of the stem, as also from the fruits.

Burke, **EDANUS** (1743-1802), an American jurist born in Galway, Ireland. He emigrated to America at an early age and settled in Charleston. He was active in the military events of that vicinity during the Revolutionary war. A lawyer by profession, his services were considered more valuable in civil than in military affairs and the provisional legislature appointed him a judge of the Supreme Court of the newly organized state in 1778. Following the fall of Charleston in 1780 he accepted a commission in the army, but resumed judicial office when the Americans regained the state in 1782. He served as first United States Senator from South Carolina, although opposed to the Federal Constitution, which he feared would result in an unwise consolidation of power in the hands of a few. Later he became Chancellor of the State of North Carolina. He was the favorite friend of Aaron Burr. He died March 30, 1802.

Burke (burk), **EDMUND**, a writer, orator, and statesman of great eminence, was born in Dublin, January 1, 1730. After studying at Trinity College, Dublin, where he took a bachelor's degree, he went to London in 1750, and became a law student at the Temple. He applied himself more to literature than to law, and in 1756 published his *Essay on the Sublime and the Beautiful*, which attracted considerable attention, and procured him the friendship of some of the most notable men of the time. The political career for which he had been arduously preparing himself all along at length opened up to him on his appointment as private secretary to Mr. W. G. Hamilton, secretary for Ireland, in 1761. On his return he was rewarded

Burke

with a pension of £300 per annum, and obtained the appointment of private secretary to the Marquis of Rockingham, then First Lord of the Treasury. Through the same interest he entered parliament as member for Wendover (1763). The great question of the right of taxing the American colonies was then occupying parliament, and the Rockingham ministry having taken, mainly through Burke's advice, a middle and undecided course, was soon dissolved (1766). From 1770 to 1782 Lord North was in power, and Burke held no office. In 1774-80 he was member for Bristol. In several magnificent speeches he criticised the ministerial measures with regard to the colonies, and advocated a policy of justice and conciliation. In 1782, when the Rockingham party returned to power, Burke obtained the lucrative post of paymaster-general of the forces, and shortly after introduced his famous bill for economical reform, which passed after considerable modifications had been made on it. On the fall of the Duke of Portland's coalition ministry, 1783, of which Burke had also been part, Pitt again succeeded to power, and it was during this administration that the impeachment of Hastings, in which Burke was the prime mover, took place. The lucidity, eloquence, and mastery of detail which Burke showed on this occasion have never been surpassed. The chief feature in the latter part of Burke's life was his resolute struggle against the ideas and doctrines of the French revolution. His attitude on this quest, separated him from his old friend Fox, and the Liberals who followed Fox. His famous *Reflections on the Revolution in France*, a pamphlet which appeared in 1790, had an unprecedented sale, and gave enormous impetus to the reaction which had commenced in England. From this most of his writings are powerful pleadings on the same side. We may mention *An Appeal from the New to the Old Whigs*; *Letter to a Noble Lord*; *Letters on a Regicide Peace*; etc. In 1794 he withdrew from parliament. Three years after, on July 8, 1797, he died, his end being hastened by grief for the loss of his only son.

Burke, **ROBERT O'HARA**, an Australian explorer, born in County Galway, Ireland, in 1821; died in Australia in 1861. After serving in the Austrian army he went to Australia, and after seven years' service as inspector of police was appointed commander of an expedition to cross the continent of Australia from south to north. He and his associate Wills reached the tidal waters

of the Flinders river, but both perished of starvation on the return journey.

Burleigh (bur'le), Lond. See *Cecil*.

Burlesque (bur-lesk') signifies a low form of the comic, arising generally from a ludicrous mixture of things high and low. High thoughts, for instance, are clothed in low expressions, noble subjects described in a familiar manner, or *vice versa*. It is a take-off or mockery of something more serious.

Burletta (bur-let'a), a light, comic species of musical drama, which derives its name from the Italian *burlare*, to jest.

Burlingame (bur'lin-gam), ANSON, diplomat, was born in New York in 1820; died in 1870. He was an early worker in the free-soil party; a leader in the American party; and a member of congress, 1854-61. In 1861 he was sent as minister to China and here negotiated important treaties, securing China's recognition of international rights of property, trade, and worship. About the end of 1867 he was appointed by China ambassador to the United States and the great powers of Europe.

Burlington (bur'ling-tun), a city, county seat of Des Moines Co., Iowa, on the Mississippi River, 206 miles S. W. of Chicago. It is a railroad center and an important manufacturing point; its industries include iron and wood-working establishments, cigars, chemicals, baskets, etc. Here are the machine shops of the Chicago, Burlington and Quincy Railroad. The city has the commission form of government. Pop. 24,324.

Burlington, a city of New Jersey, on the Delaware River, 18 miles above Camden. It has several important industries, including iron foundries, shoe factories, silk mill, etc. It was first settled in 1667. Pop. 8336.

Burlington, a city of Vermont, county seat, Chittenden County, and a port of entry on the eastern shore of Lake Champlain, has a large inland commerce. It is the seat of the University of Vermont, founded in 1791. It is one of the leading lumber markets in the United States, and has varied manufacturing industries. Green Mount Cemetery holds the grave of Ethan Allan, the revolutionary hero, and Fort Ethan Allan, a cavalry post, is three miles distant. Pop. 20,468.

Burmah (bur'ma), a country of Southern Asia, bounded on the north by Assam and Thibet, on the east by Chinese territory and Siam, elsewhere

mainly by the Bay of Bengal; area about 236,700 square miles. It is traversed by great mountain ranges branching off from those of Northern India and running parallel to each other southwards to the sea. Between these ranges and in the plains or valleys here situated the four great rivers of Burmah—the Irrawaddy, its tributary the Kyen-dwen, the Sittang, and the Salwen—flow in a southerly direction to the sea, watering the rich alluvial tracts of Lower Burmah, and having at their mouths all the great seaports of the country—Rangoon, Bassein, Moulmein, Akyab, etc. The Irrawaddy is of great value as a highway of communication and traffic, being navigable beyond Bhamo, near the Chinese frontier, or over 800 miles. In their lower courses the rivers often overflow their banks in the rainy season. Though its resources are almost entirely undeveloped, the country, as a whole, is productive, especially in the lower portions. Here grow rice, sugar-cane, tobacco, cotton, indigo, etc. Cotton is grown almost everywhere; tea is cultivated in many of the more elevated parts. The forests produce timber of many sorts, including teak, which grows most luxuriantly, and is largely exported. Iron-wood is another valuable timber, and among forest products are also the bamboo, cutch, stick-lac, and rubber. Burmah has great mineral wealth—gold, silver, precious stones, iron, marble, lead, tin, coal, petroleum, etc.; but these resources have not yet been much developed. The chief precious stone is the ruby, and the mines of this gem belong to the crown. Sapphire, amber, and jade are also obtained. Among wild animals are the elephant, rhinoceros, tiger, leopard, deer of various kinds, and the wild hog. Among domestic animals are the ox, buffalo, horse, and elephant. The rivers abound with fish. The most common fruits are the guava, custard apple, tamarind, pine, orange, banana, jack, and mango. The yam and sweet potato are cultivated, and in some parts the common potato. The climate, of course, varies according to elevation and other circumstances, but as a whole is warm, though not unhealthy, except in the low, jungly districts. The rainfall among the mountains reaches as high as 100 inches per annum.

The population by the last census taken was stated as 10,490,624, made up of a great variety of races besides the Burmese proper, as Talaings, Shans, Karens, etc. The Burmese proper are of a brown color, with lank, black hair (seldom on the face), and have active, vigorous

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well-proportioned frames. They are a cheerful, lively people, fond of amusement, averse to continuous exertion, free from prejudice of caste or creed, temperate and hardy. The predominant religion is Buddhism. Missionaries are active in their efforts, but the Christian faith has not yet made much progress in the country. Polygamy is permitted by Buddhist law, but is rare, and is considered as not altogether respectable. Divorce is easily obtained. Women in Burmah occupy a much freer and happier position than they do in Indian social life. They go about freely, manage the household, and make successful women of business, conducting not merely retail trades but also large wholesale concerns. Education is very general, one of the chief occupations of the monks in the numerous monasteries being the teaching of boys to read and write. Many of these monastic schools are under government inspection. The Burmese are skillful weavers, smiths, sculptors, workers in gold and silver, joiners, etc. The ordinary buildings are of a very slight construction, chiefly of timber or bamboo raised on posts; but the religious edifices are in many cases imposing, though the material is but brick. Carving and gilding are features of their architecture. The Burmese language is monosyllabic, like Chinese, and is written with an alphabet the characters of which (derived from India) are more or less circular. There is a considerable literature.

Burmah is now divided into *Lower Burmah* and *Upper Burmah*, the former till 1886 being called British Burmah, while the latter till that date was an independent kingdom or empire. Lower Burmah was acquired from independent Burmah in 1826 and 1852 as the result of two wars terminating in favor of Britain. It comprises the divisions of Aracan, Pegu, Irrawaddy, and Tenasserim; area, 87,473 sq. miles; pop. (1901) 5,389,897. Under British rule it has prospered greatly, the population and trade having increased immensely, and there being regularly a large surplus revenue. Roads, canals, and railways have been constructed and other public works carried out, as also public buildings erected. The chief city and port is Rangoon, which is now connected by railway with Mandalay in Upper Burmah.

Under its native kings the form of government in Upper Burmah was absolute monarchy, the seat of government being latterly at Mandalay. The king was assisted in governing by a council of state known as the *Hloot-daw*, to which belonged the functions of a house of

legislature, a cabinet, and a supreme court. The king had power to punish at his pleasure anyone, even the great officers of state. The revenue was derived from taxes levied in a very irregular and capricious manner, and official corruption was rampant. The criminal laws were barbarously severe. Capital punishment was commonly inflicted by decapitation, but crucifixion and disemboweling were also practised. After the loss of the maritime provinces the influence of independent Burmah greatly declined, as did also its Asiatic and foreign trade.

The Burmese empire is of little note in ancient or general history. Since the 16th century the Burmese proper have mostly been the predominant race, and ruled the Peguans, Karens, etc., throughout the country. The capital has at different times been at Ava, Pegu, Prome, or elsewhere. In the latter half of the 18th century the Burmese emperors began a series of wars of conquest with China, Siam, Assam, through which they greatly enlarged the empire. This brought them into contact with the British, and in 1824 war was declared against them on account of their encroachments on British territory and their seizure of British subjects. The war terminated in the cession of the provinces of Aracan and Tenasserim to the British. Peace continued for some years, but at a later date various acts of hostility were committed by the Burmese, and in 1852 the maltreatment of British subjects occasioned a second war, at the end of which the British possessions were extended to include the whole of Pegu. The third and last war occurred in 1885 in consequence of the arrogance and arbitrary conduct of King Theebaw. The result was that Upper Burmah was annexed to the British empire by proclamation of the Viceroy of India, 1st Jan., 1886. The area thus annexed was about 200,000 sq. miles, of which half belonged to the kingdom proper, half to the semi-independent Shan states. The seat of government under the new administration is Rangoon.

Burnaby (bur'-na-bi), FREDERICK GUSTAVUS, an English soldier and traveler, born in 1842, educated at Harrow, and entered the Royal Horse Guards in his eighteenth year. He subsequently became an extensive traveler, and in 1875 he made his famous ride to Khiva—a journey that presented great difficulties. In 1876 he rode through Asiatic Turkey and Persia. Of both these journeys he published narratives. In 1885 (Jan. 17), while serving as lieutenant-colonel of the Royal Horse Guards in the Egypt

tian campaign, he was slain at the battle of Abu-Klea.

Burne-Jones, SIR EDWARD, an English painter, born in 1833, at Birmingham, where and at Exeter College, Oxford, he was educated. He early adopted the profession of artist, and came under the influence of D. G. Rossetti. He painted in water-color as well as oil, and his works are remarkable for richness of coloring as well as for their poetical ideal. The *Mirror of Venus* sold for 5000 guineas. He was knighted in 1894 and died in 1898.

Burnand, SIR FRANCIS COWLEY, an English humorist, born in 1837; was educated at Eton and Cambridge and admitted to the bar in 1862. He became chief editor of *Punch* in 1874, and published novels, burlesque plays, etc. Among his works of burlesque are *Happy Thoughts*, *Happy Thought Hall*, etc.

Burnes (bérns), SIR ALEXANDER, was born at Montrose, Scotland, in 1805, studied at the academy there, and having obtained a cadetship in the Indian army, arrived at Bombay in 1821. His promotion was rapid, and in 1832 he was sent on a mission to Central Asia, and visited Afghanistan, Bokhara, Merv, etc., returning by way of Persia. He was then sent to England, and published his travels, which were read with a degree of enthusiasm. In 1839 he was appointed political agent at Cabul. Here, in 1841, he was murdered on the breaking out of an insurrection.

Burnet (bur'net), the popular name of two genera of plants, natural order Rosaceæ.—1. COMMON or LESSER BURNET (*Poterium sanguisorba*), a perennial plant of Europe and N. America which grows to the height of about 2 feet, with smooth, alternate, imparipinnate leaves, and flowers arranged in rounded heads of a purplish color.—2. GREATER BURNET (*Sanguisorba officinalis*), also a perennial plant with imparipinnate leaves; flowers red, arranged on oval spikes at the extremity of long peduncles. Both kinds make very wholesome food for cattle. *S. Canadensis* is a Canadian species.

Burnet, GILBERT, a celebrated prelate and historian, born at Edinburgh in 1643. Having studied at Aberdeen, he traveled into Holland in 1664. He was ordained in 1665, was for some years minister of Saltoun parish, and became professor of divinity at Glasgow in 1669. Here he resided more than four years and wrote several works, one of them his *Vindication of the Church and*

State of Scotland. In 1675 he became chaplain to the Rolls Chapel, London. He was long in great favor at court, but the court favor did not continue, for Burnet, dreading the machinations of the Catholic party, joined the opposition, and wrote his *History of the Reformation in England*, the first volume of which appeared in 1679 (the other two in 1681 and 1714, respectively). His connection with the opposition party afterwards became very intimate, and he published several works in favor of liberty and Protestantism. Eventually he was invited to The Hague by the Prince and Princess of Orange, and had a great share in the councils relative to Britain. He accompanied the Prince of Orange to England as chaplain, and was rewarded for his services with the bishopric of Salisbury. As a prelate Bishop Burnet distinguished himself by fervor, assiduity, and charity. He died in March 1715, leaving behind him his well-known *History of his Own Times* (two vols. fol., 1723-24).

Burnett (bur'net), FRANCES ELIZA (HODGSON), novelist, born in Manchester, England, in 1849. At the close of the Civil war she came to the United States, and in 1873 married Dr. S. M. Burnett; resided at Washington some time, afterwards in London. She was divorced from her husband in 1899 and the following year married Stephen Townsend, an English lawyer. She became well known as a novelist by *That Lass of Lowrie's*, while her *Little Lord Fauntleroy* became an immense favorite. Other works were *Haworth's*, *Louisiana*, *Through One Administration*, *A Lady of Quality*; *His Grace*, *the Duke of Ormonde*, etc.

Burnett, JAMES. See *Monboddo*, Lord.

Burnett Prizes, prizes established by a Mr. Burnett, merchant, of Aberdeen, on his death in 1784. He left a fund from which were to be given every forty years two theological prizes (not less than £1200 and £400) for the best two essays in favor of the evidence that there is an all-powerful, wise, and good Being, and this independent of all revelation. The first competition was in 1815, when Dr. Brown, principal of Aberdeen University, gained the first prize, and Dr. John Bird Sumner, afterwards Archbishop of Canterbury, the second. In 1855 the first prize was adjudged to the Rev. R. A. Thompson, Lincolnshire, and the second prize to the Rev. Dr. John Tulloch, afterwards principal of St. Mary's College, St. Andrews. The destination of the fund was

Burnett's Disinfecting Liquid

Burns

afterwards altered by parliament, and courses of lectures are now delivered, the first, on Light, being by Prof. Gabriel Stokes in 1882.

Burnett's Disinfecting Liquid,

an antiseptic liquid and deodorizer prepared from chloride of zinc. It is useful in deodorizing sewage, bilge-water in ships, etc., and is found of service in the dissecting-room.

Burney (bur'ni), CHARLES, an English composer and writer on music, born in 1726; died in 1814. He studied under Dr. Arne, and soon obtained a reputation for his musical pieces. While organist at Lynn Regis he commenced his *General History of Music*. He wrote also several other valuable works.

Burney, FRANCES, daughter of the preceding, also known as Madame D'Arblay, an eminent novelist, born in 1752; died in 1840. Her first novel, *Evelina*, appeared in 1778 and attracted remarkable attention, able critics pronouncing the author superior to Fielding. Her second book, *Cecilia*, added to her reputation, it being placed among the classic novels of Europe. In 1786 she became second keeper of the robes to Queen Charlotte, and for five years lived an unhappy life. In 1792 she married Count D'Arblay, an estimable French exile. She afterwards wrote other novels and published her *Diary and Letters*, a work of much interest. It is a little difficult in our day to understand the extravagant eulogies of her novels by her contemporaries.

Burnham (burn'am), SHERBURNE WESLEY, astronomer born at Thetford, Vermont, in 1838. He became connected with the Lick and Chicago observatories and was appointed professor of practical astronomy at the University of Chicago. He is notable for his discovery of double stars, of which he has catalogued more than 1200.

Burning-glass, a lens which, by bringing the sun's rays rapidly to a focus, produces a heat strong enough to kindle combustible matter. The lenses commonly used are convex on both sides, and have a small focal distance. That such a glass may produce its greatest effect it is necessary that the rays of the sun should fall upon it in a perpendicular direction. The use of a second lens, of a smaller focal distance, placed between the first and its focus. Some immense burning-glasses have been made, producing surprising effects. Concave burning-mirrors pro-

duce the same kind of results, and have almost four times more power than burning-glasses of equal extent and curvature. The concavity must present a surface of high reflecting power (polished silver or other metal, or silvered glass), and must be either spherical or parabolic. Plane mirrors may also be employed like concave ones, if several of them are combined in a proper manner. The ancients were acquainted with such mirrors, and Archimedes is said to have set the Roman fleet on fire at the siege of Syracuse (B.C. 212) by some such means. In 1747 Buffon by a combination of mirrors burned wood at the distance of 200 feet and melted tin at the distance of 150 feet, with other interesting experiments.

Burnisher (bur'nish-er), a blunt, smooth tool, used for smoothing a rough surface by rubbing. Agates, tempered steel, and dogs' teeth are used for burnishing.

Burnley (burn'li), a parliamentary and municipal borough of England, in Lancashire, about 22 miles N. of Manchester. The town presents a modern appearance, and is, generally speaking, well built, mainly of stone. The staple manufacture is cotton goods, there being large cotton-mills, also several extensive foundries and machine-shops, with collieries and other works, in the vicinity. Pop. (1911) 106,337.

Burnoose (bér-nōs), a large kind of mantle in use among the Bedouin Arabs and the Berbers of Northern Africa, commonly made of white wool, but sometimes also of red, blue, green, or some other color, and having a hood which may be drawn over the head in case of rain.

Burnouf (bür-nōf), EUGÈNE, a French scholar, born at Paris in 1801; died in 1852. He devoted himself to the study of oriental languages, particularly those of Persia and India. In 1826 he attracted the attention of men of learning throughout Europe by publishing in conjunction with his friend Chr. Lassen, an *Essay on the Pali*, or the sacred language of the Buddhists in Ceylon and the Eastern Peninsula. But his fame is chiefly due to his having, so to speak, restored to life an entire language, the Zend or old Persian language in which the Zoroastrian writings were composed. Burnouf also distinguished himself by his labors on Buddhism, publishing *Introduction à l'Histoire du Bouddhisme Indien*.

Burns, JOHN, an English labor leader, born at Vauxhall in 1858. He worked as rivet-boy and engineer, early became a Socialist, and at-

tracted attention in his speeches on this topic. Becoming active as a labor leader, he greatly aided the dock laborers in winning in their 1889 strike. He was thrice elected to the London County Council, was elected to Parliament in 1892 and 1895, and in 1905 became a member of the Liberal ministry, as president of the local government board.

Burns, ROBERT, the great lyric poet of Scotland, was born near Ayr, January 25, 1759, his father being a gardener, and latterly a small farmer. He was instructed in the ordinary branches of an English education by a teacher engaged by his father and a few neighbors; to these he afterwards added French and a little mathematics. But most of his education was got from the general reading of books, to which he gave himself with passion. In this manner he learned what the best English poets might teach him, and cultivated the instinct for poetry which had been implanted in his nature. At an early age he had to assist in the labors of the farm, and when only fifteen years old had to do almost the work of a man. In 1781 he went to learn the business of flax-dresser at Irvine, but the premises were destroyed by fire, and he was thus led to give up the scheme. His father dying in 1784, he took a small farm (Mossgiel) in conjunction with his younger brother Gilbert. He now began to produce poetical pieces which attracted the notice of his neighbors and gained him considerable local reputation. His first lines had been written some time previously, having been inspired by love, a passion to which he was peculiarly susceptible. While at Mossgiel he formed a connection with Jean Armour, a Mauchline girl, which resulted in the prospect of her soon becoming a mother. Burns was willing to marry her, but her father, a respectable master mason, would not permit it, deeming Burns, on account of his poor circumstances, and perhaps for other reasons, no suitable match. This affair rendered the poet's position so uncomfortable, and so wounded his pride, that he determined to emigrate to Jamaica, and engaged himself as assistant overseer on a plantation there. To obtain the funds necessary for the voyage he was induced to publish, by subscription, a volume of his poetical effusions. It was printed at Kilmarnock in 1786, and Burns, having thus obtained the assistance he expected, was about to sail from his native land, when he was drawn to Edinburgh by a letter from Dr. Blacklock to an Ayrshire friend of his and the poet, recommending that he should take

advantage of the general admiration his poems had excited, and publish a new edition of them. This advice was eagerly adopted, and the result exceeded his most sanguine expectations. After remaining more than a year in the Scottish metropolis, admired, flattered, and caressed by persons of eminence for their rank, fortune, or talents, he retired to the country with the sum of some \$2500, which he had realized by the second publication of his poems. A part of this sum he advanced to his brother, and with the remainder took a considerable farm (Ellisland) near Dumfries, to which he subsequently added the office of exciseman. He now married, or rather formally completed his marriage with, Jean Armour. But the farming at Ellisland was not a success, and in about three years Burns removed to Dumfries and relied on his employment as an exciseman alone. He continued to exercise his pen, particularly in the composition of a number of beautiful songs adapted to old Scottish tunes. But his residence in Dumfries, and the society of the idle and the dissipated who gathered round him there, attracted by the brilliant wit that gave its charm to their conviviality, had an evil effect on Burns, whom disappointment and misfortunes were now making somewhat reckless. In the winter of 1795 his constitution, broken by cares, irregularities, and passions, fell into premature decline; and in July, 1796, a rheumatic fever terminated his life and sufferings at the early age of thirty-seven. He left a wife and four children, for whose support his friends and admirers raised a subscription, and with the same object an edition of his works, in four vols. 8vo, was published in 1800 by Dr. Currie, of Liverpool. His character, though marred by imprudence, was never contaminated by duplicity or meanness. He was an honest, proud, warm-hearted man, combining sound understanding with high passions and a vigorous and ex-cursive imagination. He was alive to every species of emotion; and he is one of the few poets who have at once excelled in humor, in tenderness, and in sublimity.

Burns and Scalds are injuries produced by the application of excessive heat to the human body. They are generally dangerous in proportion to the extent of surface they cover, and a widespread scald may cause serious consequences on account of the nervous shock. Congestion of the brain, pneumonia, inflammation of the bowels, or lockjaw may result from an extensive burn. Hence the treatment requires to

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be both local and constitutional. If there is shivering or exhaustion stimulants may be resorted to, or if the pain is intense, sedatives given. The local treatment will consist in carrying out the instructions of the physician, who should be summoned at once in cases of bad burns. Many remedies of home treatment have been recommended; but these should be applied with caution, that the condition of the sufferer may not be aggravated rather than relieved. The utmost care should be exercised in removing the clothing from the patient, and the injured parts should be handled with gentleness. Sometimes, if the burn be not too extensive, applications of cold water to the part will afford relief. Burns differ from scalds in being caused by dry heat, while scalds are caused by moist heat.

Burnside (burn'sid), AMBROSE EVERETT, an American soldier, born at Liberty, Indiana, in 1824; died Sept. 13, 1881. He was graduated at the West Point Military Academy in 1847 and served in the army until 1853, when he retired to private life. On the outbreak of the Civil war he became a colonel of volunteers, commanding a brigade at Bull Run, and in 1862 commanded the expedition which captured Roanoke Island and Newbern. Promoted successively brigadier- and major-general, he took part in the battles of South Mountain and Antietam with distinction, and when, on Nov. 7, 1862, General McClellan was relieved from his command, Burnside succeeded him as commander of the Army of the Potomac. In the following December he crossed the Rappahannock and attacked Lee in his entrenchments at Fredericksburg, but was repulsed with frightful loss. Removed from his command at his own request, he repulsed Longstreet at Knoxville, in Sept., 1863. He commanded the ninth corps in Grant's advance on Richmond in 1864. After the war he was for three terms elected Governor of Rhode Island and was elected to the United States Senate in 1875 and 1881.

Burnt Offering, something offered altar as an atonement for sin; a sacrifice. The burnt offerings of the Jews were either some clean animal, as an ox, a sheep, a pigeon; or some species of vegetable substance, as bread, flour, ears of wheat or barley.

Burnt Sienna, an ochereous earth (Terra di Sienna) known as sienna earth (Terra di Sienna) submitted to the action of fire, by which it is converted into a fine orange-brown pigment, used both in oil and water-color painting.

Burr

Burnt Umber, a pigment of reddish-brown color obtained by burning umber, a soft, earthy mixture of the peroxides of iron and manganese, deriving its name from Umbria in Italy.

Buro. See *Booro*.

Burr, AARON, third vice-president of the United States, was born in New Jersey in 1756. After serving with honor in the Revolutionary army he became a lawyer, and an adroit orator. He finally became a leader of the Democratic party and was elected vice-president under Jefferson in 1800. In fact, Jefferson and Burr secured equal numbers of electoral votes, and only an exciting contest in Congress settled their respective positions as president and vice-president. In 1804 he sought to become governor of New York, but was defeated, partly through the agency of Alexander Hamilton. He challenged Hamilton, and killed him in a duel in July, 1804. This act ended Burr's political career. The storm of popular indignation was so great that he found it expedient to leave New York and go west. Here he conceived an audacious scheme of founding an empire at the expense of Mexico in the southwest. His purpose being suspected, he was arrested and tried for treason, and though acquitted, sank into obscurity. He died Sept. 14, 1836.

Burrard Inlet (bur'ard), an inlet of British Columbia, forming a fine harbor, and having Vancouver, the terminus of the Canadian Pacific Railway, on its northern shore.

Burrillville (bur'il-vil), a township (town) of Providence Co., Rhode Island, about 22 miles N.W. of Providence, has manufactures of cotton and woolen goods, etc. Pop. 7878.

Bur'ritt (bur'it), ELIMU, the 'learned blacksmith,' was born at New Britain, Conn., Dec. 8, 1810. He was apprenticed to a blacksmith, but began to read English literature, and acquired proficiency in the ancient and most modern languages of Europe. He afterwards came into public notice as a lecturer on behalf of temperance, the abolition of slavery and war, etc., and published papers, and founded organizations to further these ends. In 1848 the first International Peace Congress was held under his guidance at Brussels. In 1865 he was consular agent at Birmingham. In 1868 he returned to live on his farm in America, and died March 7, 1879. His best-known writings are *Sparks from the Anvil*; *Thoughts and Things at Home and Abroad*; *Chips from Many Blocks*; etc.

Burroughs (bur'ros), JOHN, naturalist and author, born at Roxbury, New York, in 1837. He became a journalist in New York city and in 1863 received an appointment in the United States Treasury Department. In later years he settled on a farm in New York, dividing his time between fruit culture, literary work, and services as a bank examiner. He wrote much for periodicals and such works as *Wake Robin*, *Winter Sunshine*, *Birds and Poets*, *Locusts and Wild Honey*, *Essays on Trees, Birds and Flowers*, etc. His works are vivacious and idiomatic in style and have been very popular.

Burrowing Owl, an American owl, the *Athene cunicularia*, which dwells in holes in the ground made either by itself or by some other animal, as the prairie-dog or marmot. It feeds on insects and seeks its food by day.

Burr'stone. See *Buhrstone*.

Bursary (bur'sa-ri), an endowment in one of the Scotch universities, corresponding to an exhibition in an English university, and intended for the support of a student during his ordinary course, and before he has taken a degree in the faculty in which he holds the bursary. This circumstance, according to the usage prevailing in Scotland, distinguishes bursaries from scholarships and fellowships, both of which are bestowed after the student has taken a degree. Each of the four universities of Scotland has a greater or smaller number of bursaries. Of late years most bursaries are awarded after competitive examination, and only a few are now given by the patrons for special reasons.

Burslem (burs'lem), a town of England, in Staffordshire, within the parliamentary borough of Stoke-upon-Trent, and in the center of 'The Potteries.' Burslem has extensive manufactures of china and earthenware, in which trade and coal-mining the inhabitants are chiefly employed. Pop. (1911) 44,153.

Burstall (bur'stal), SIR HENRY EDWARD, a Canadian soldier (1870-), born at Quebec. He served with the Yukon forces, 1898-99, and in the South African war, 1899-1901. During the European war (1914-18) Major-General Burstall was in command of the Second Canadian Division.

Burton (bur'ton), JOHN HILL, historian of Scotland, born at Aberdeen in 1809; died near Edinburgh, in 1881. He graduated at Marischal College, Aberdeen, adopted the law as a pro-

fession, and became an advocate in Edinburgh, but literature was really the business of his life. He early contributed to the *Edinburgh and North British*, to *Blackwood's Magazine*, and to the *Scotsman*. His first book was the *Life and Correspondence of David Hume* (1846), followed by *Lives of Lord Lovat and Duncan Forbes of Culloden*, and other works. His chief work was his *History of Scotland from the Earliest Times to 1746* (2d edition, 8 vols. 1837); others equally well known were *The Scot Abroad*, and the *Book-hunter*. He was appointed secretary to the Scottish Prison Board in 1854, and was connected with this department till his death.

Burton, SIR RICHARD FRANCIS, an English traveler and linguist; born in 1821; died in 1890. He joined the Indian army in 1842, and showed a remarkable facility in acquiring the languages and manners of the natives. In 1853 he went to Arabia, and visited Mecca and Medina disguised as a Mohammedan pilgrim—a very perilous enterprise. After serving in the Crimean war he made a journey to East Africa along with Captain Speke, which led to the discovery of the great lake Tanganyika. He served as British consul at Fernando Po, at Santos in Brazil, and from 1872 at Trieste. He visited numerous countries and published many works, amongst which are *Sindh and the Races that Inhabit India*; *Personal Narrative of a Pilgrimage to El Medinah and Mecca*; *The Lake Regions of Central Africa*; *The City of the Saints and Across the Rocky Mountains to California*; *The Nile Basin*; *The Highlands of Brazil*; *Ultima Thule, or a Summer in Iceland*; *The Gold Mines of Midian*; *The Book of the Sword*; translations of Camoens's *Lusiad* and of the *Arabian Nights*, etc.

Bur'ton, ROBERT, an English writer, born at Lindley in Leicestershire in 1576. He studied at Christ Church, Oxford, where he seems to have lived all his life. His vast out-of-the-way learning is curiously displayed in his book *The Anatomy of Melancholy*, which he published in 1621. Burton died in 1640.

Burton, WILLIAM E., a celebrated comedian, born in London, in 1804; died in New York, in 1860. He resided in the United States after 1834 and was manager of several theaters in New York and Philadelphia. He edited *Cyclopedia of Wit and Humor*.

Burton-on-Trent, a municipal borough of England, in Staffordshire, on the N. bank of the Trent, in a low, level situation. Malting and iron-founding are carried on to a con-

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siderable extent, but it is chiefly cele-
brated for its excellent ale, for which
there are numerous breweries, employing
upwards of 5000 men and boys. Pop.
(1911) 48,275.

Burtscheid (burt'shit), a town in
Rhenish Prussia, form-
ing a suburb of Aix-la-Chapelle, with ex-
tensive manufactures, particularly of
woolens, and celebrated thermal springs.
Pop. 15,871.

Buru. See *Booro*.

Burujird. See *Booroojird*.

Bury (be'ri), a municipal and parlia-
mentary borough of England, in
Lancashire, 8 miles N. N. W. of Manches-
ter, well situated on a rising ground be-
tween the Irwell and the Roche. The
staple manufacture is that of cotton, and
there are also large woolen factories,
bleaching and printing works, dye-works,
foundries, etc. There are extensive coal
mines in the vicinity. Pop. (1911)
58,640.

Burying Beetle (*Necrophorus*), the
name of a genus of
insects belonging to the order Coleoptera,
or beetles, and the tribe of the Silphidae,
or carrion beetles.

Bury St. Edmund's, or **St. Ed-
mundsbury**,
a parliamentary and municipal borough
in Suffolk, England, well built and de-
lightfully situated on the Lark, 26 miles
from Ipswich. Agricultural implements
are manufactured, and there is a large
trade in agricultural produce. It is an
ancient place, and derived its name from
St. Edmund, a king of the East Angles,
slain by the heathen Danes and buried
here. It contains the remains of an ab-
bey, once the most wealthy and magnifi-
cent in Britain. Pop. 16,785.

Busaco (bü-sa'kö), a mountain ridge
in the province of Beira,
Portugal. It was here that Wellington
repulsed Massena (27th September, 1810)
and continued his retreat to the lines of
Torres Vedras.

Busby (buz'bi), a military headdress
worn by hussars, artillerymen,
and engineers, consisting of a fur hat with
a bag, of the same color as the facings of
the regiment, hanging from the top over
the right side. The bag appears to be a
relic of a Hungarian headdress from
which a long padded bag hung over, and
was attached to the right shoulder as a
defense against sword-cuts.

Bush'buck, a name given to several
African species of ante-
lopes, especially to *Tragelaphus sylvatica*,
4 feet long and 2½ feet high, with tri-

angular subspiral horns. The male is
dark sepia brown; the female reddish
brown above; both white below. The
white-backed bush is the *Cephalo-
phus sylvaticus*, a white-backed antelope
of Sierra Leone, with black, shining,
pointed, and nearly straight horns.

Bushel (bush'el), a dry measure, con-
taining 8 gallons or 4 pecks.
The British imperial bushel introduced in
1826 has a capacity of 2218.192 cubic
inches, and holds 80 lbs. avoirdupois of
distilled water at the temperature of 62°
Fahr. with the barometer at 30 inches.
The standard United States bushel is sim-
ilar, containing 77.627 lbs. of water, or
2150.42 cubic inches.

Bushire (bū'shēr; properly, *Abu
Shehr*, the father of cities),
the principal seaport of Persia, on the
Persian Gulf, 118½ miles W. S. W. Shiraz.
It lies on the edge of a desert, and car-
ries on a considerable traffic with India
and Britain, importing rice, indigo, sugar,
cotton goods, etc., and exporting shawls,
dates, tobacco, carpets, wool drugs, etc.
Pop. estimated at 15,000.

Bushmen (bush'men), or **BOSES-
MANS**, a race of people who
dwell in the western part of South Africa,
in the immense plains bordering on the
N. side of the colony of the Cape of Good
Hope. They are the most degraded of
the races who inhabit this country, uniting
only for defence or pillage. They have
no huts, and do not cultivate the land,
but live by hunting. Their language is
exceedingly crude, consisting only of a cer-
tain clicking with the tongue and gurgling
sound, for which we have no letters.

Bushnell, HORACE, an American the-
ologian, born at Litchfield,
Conn., in 1802; died in 1876. He studied
at Yale and was pastor of the North Con-
gregational Church, Hartford, 1833-59.
His book, *God in Christ* (1849), involved
him in a charge of heresy, which, how-
ever, was not sustained. His works ap-
peared in eight volumes, 1876-7.

Bush-pig. See *Bosch-vark*.

Bushrangers (bush-ran-jers), the
name for desperadoes
in Australia who, taking to the bush,
supported themselves by levying contribu-
tions on the property of all and sundry
within their reach. Considerable gangs
of these lawless characters sometimes col-
lected, a body of fifty holding part of
New South Wales in terror about 1830.

Bush-shrikes, American birds of
the shrike family,
forming the group *Thamnophilinae*.

Busiris (by-si-ris), a town of ancient
Egypt, in the Delta, the
chief place where the rites of Isis were

celebrated. The name is also given as that of a mythical Egyptian king.

Bus'kin, a kind of high shoe worn upon the stage by the ancient actors of tragedy, in order to give them a more heroic appearance: often used figuratively for tragedy, like 'sock' for comedy.

Buss, a small vessel from 50 to 70 tons burden, carrying two masts, and with two sheds or cabins, one at each end, used in herring-fishing.

Bussa, **BUSSANG**. See *Boussa*.

Bussorah (bus'-o-ra), See *Bassora*.

Bussu-palm, the *Manicaria saccifera*, found in the swamps of the Amazon, whose stem is only 10 to 15 feet high, but whose leaves are often 30 feet long by 4 to 5 feet in breadth. These are used by the Indians for thatch, the spathes are used as bags, or when cut longitudinally and stretched out they form a coarse but strong kind of cloth.

Bust (Fr. *buste*, It. *busto*), in sculpture, the representation of that portion of the human figure which comprises the head and the upper part of the body. During the literary period of Greece the portrait busts of the learned formed an important branch of art, and in this way we came to possess faithful likenesses of Socrates, Plato, Demosthenes, etc., in which the artist showed great power of expressing the character of those represented. The number of busts belonging to the time of the Roman Empire is very considerable, but those of the Roman poets and men of letters have not been preserved in nearly so large numbers as those of the Greeks. The first bust that can be depended upon as giving a correct likeness is that of Scipio Africanus the elder.

Bustard (bus'tard), a bird belonging to the order *Cursores*, or runners, but approaching the waders. The great bustard (*Otis tarda*) is the largest



Great Bustard (*Otis tarda*).

European bird, the male often weighing 30 lbs., with a breadth of wing of 6 or 7 feet. The bustard is now rare in Britain,

but abounds in the south and east of Europe and the steppes of Tartary, feeding on green corn and other vegetables, and on earthworms. Its flesh is esteemed. All the species run fast, and take flight with difficulty. The little bustard (*O. tetrax*) occasionally visits Britain. *O. nigriceps* is an Asiatic and *O. oarulescens* an African species. The Australian species (*O. Australiænsis*) is a magnificent bird highly prized as food.

Busto-Arsizio (būs'tō-ār-ed'zē-ō), a town of N. Italy, 20 miles N. W. of Milan. It has large cotton factories. Pop. 17,304.

Butcher-bird. See *Shrike*.

Butcher's Broom (by'chers brōm; *Ruscus*), a genus of plants belonging to the natural order Liliacem. The flowers are dioecious and of a green color, and rise from branchlets dilated in the form of leaves. It is a shrubby evergreen plant, with angular stems. There are several species; *Ruscus aculeatus*, or the common butcher's broom, takes its name from being used by butchers to sweep their blocks.

Bute (būt), an island of Scotland in the estuary of the Clyde, with an area of about 50 sq. miles, belonging principally to the Marquis of Bute. It is about 15 miles long, and the average breadth is 3½ miles. Agriculture is in an advanced state, and there are about 20,000 acres under cultivation. The herring fishery is also a source of considerable profit. The only town is Rothesay, whose ancient castle is one of the interesting antiquities of the island. Pop. 12,162. The county of Bute comprises the islands of Bute, Arran, Great Cumbrae, Little Cumbrae, Inchmarnock, and Pladda.

Bute, JOHN STUART, EARL OF, a British statesman, born in 1713 in Scotland. He acquired great influence over Frederick, Prince of Wales, and was appointed chamberlain to his son, afterwards George III, through whose favor he became secretary of state, and ultimately, in 1762, prime-minister. For a time Pitt and Newcastle alike had to give way to his influence, but though possessing the full confidence of the king he was unpopular with the people, and in 1763 he suddenly resigned his office, and retired from public affairs to spend his leisure in literary and scientific pursuits, particularly in botany. He died in 1792.

Butea (bū'te-a), a genus of plants, nat. order Leguminosæ, tribe Papilionacæ, natives of the East Indies. They are trees having pinnately trifoliate

leaves, with racemes of deep-scarlet flowers.

Butler (but'ler), county seat of Butler Co., Pennsylvania, 30 miles N. of Pittsburgh. Natural gas, coal and iron are found near by, and it has manufactures of woollens, silks, plate glass, steel cars, etc. Pop. 20,728.

Butler, ALBAN, an English writer, born in 1710; died in 1773. He was educated at the English (R. C.) College of Douay, where he became professor first of philosophy and then of divinity; latterly he was president of the English college of St. Omer. His *Lives of the Saints* is a monument of erudition which cost him thirty years' labor.

Butler, BENJAMIN FRANKLIN, general, and politician, born at Deerfield, New Hampshire, in 1818; died in 1893. He became noted as a criminal lawyer; in 1853 commenced to take a prominent part in politics on the Democratic side; in 1861, on the outbreak of the war, held the commission of brigadier-general of militia, and took service with his brigade on the Union side. He was the first to occupy Baltimore and Fortress Monroe, applying to the slaves that came into his camp the notable phrase of 'contraband of war.' After the opening of the lower Mississippi by Farragut he took command in New Orleans, and attracted much attention by his vigorous and effective rule. After the war he served in Congress from 1866 to 1878, and in 1882 was elected governor of Massachusetts.

Butler, JAMES, Duke of Ormonde, an eminent statesman in the reigns of Charles I and II. He was born at London in 1610, was a steady adherent of the royal cause, on the ruin of which he retired to France. At the Restoration he returned with the king, was created a duke, and appointed lord high steward of Ireland. After losing his office and the royal favor for some years, principally through the intrigues of Buckingham, he was again appointed lord-lieutenant of Ireland, and retained the post till the death of Charles, when he resigned, his principles not suiting the policy of James. He died in 1688.

Butler, JOHN (?-1794), a Tory leader in the American Revolution, born in Connecticut, but early removed to Tryon Co., N. Y. He fought at the battle of Oriskany (q. v.) in 1777 and against Sullivan in 1779. Later he joined Sir John Johnson (q. v.) in the raids on the Mohawk and Schoharie settlements. He was notorious for his ruthlessness and numerous cruelties.

Butler, JOSEPH, an English prelate and celebrated writer on ethics and theology, born in Berkshire in 1692. He wrote the *Analogy of Religion, Natural*

and Revealed, to the Constitution and Course of Nature, which was published in 1736, and acquired for him a great reputation. In 1738 he was made Bishop of Bristol, and in 1750 promoted to the see of Durham. He died in 1752.

Butler, NICHOLAS MURRAY, an American educator, born at Elizabeth, New Jersey, April 2, 1862; graduated at Columbia in 1882; took a Ph.D. degree there in 1884; also studied in Paris and Berlin. He became assistant in philosophy at Columbia in 1885, full professor in 1890. He became president of the New York College for the training of teachers (afterwards Teachers' College of Columbia University), and in 1901 succeeded Seth Low as president of Columbia. He has edited several educational series; founded the *Educational Review*; and has published *The Meaning of Education, True and False Democracy, Why Should We Change Our Form of Government? Education in the United States, The American as He Is, Philosophy*, etc.

Butler, SAMUEL, an English satirical poet, was the son of a farmer in Worcestershire, where he was born in 1612. He was educated at Worcester free-school, and held various situations as clerk or amanuensis to persons of position, among them being Sir Samuel Luke, a Puritan colonel of Bedfordshire, who is caricatured in the celebrated knight Hudibras. Butler published the first part of *Hudibras* after the Restoration, in 1663. It became immensely popular, and Charles II himself was perpetually quoting the poem, but did nothing for the author, who seems to have passed the latter part of his life dependent on the support of friends, and died in poverty in London in 1680. A second part of *Hudibras* appeared in 1664, a third in 1678. The poem is a sort of burlesque epic ridiculing Puritanism, and fanaticism and hypocrisy generally.

Butler, WILLIAM ORLANDO, an American soldier, born in Jessamine Co., Kentucky, in 1791; died in 1880. Served in the war of 1812; practiced law in Carrollton, 1817-39; was elected to Congress, 1839-43; and fought in the Mexican War, succeeding General Scott as commander of the U. S. Army in Mexico.

Butte City, the metropolis of Montana, in Silver Bow Co., one of the richest mining centers of the country, producing 18 per cent. of the world's copper. A state school of mines is located here, and one of the largest copper mining companies in existence. Elevation, 5490 feet. Pop. 65,000.

Butter (but'er), a fatty substance produced from milk, especially cows' milk. When the milk is first drawn

this fatty matter is disseminated through it in minute clear globules, which in a short time rise to the surface and form cream. This cream is then separated from the milk, put through a process of churning, and the product worked to remove the water remaining in the churned mass. In obtaining the cream from the milk three methods are in more or less general use: Shallow setting, which consists of placing the milk in wide pans about four inches high; deep setting, employing pans about 18 inches deep; and the separator method, which is that most in use among the larger producers. In the shallow pan system there is a loss in skimming of from 0.5 to 1.5 per cent. of fat left in the skim milk. In the deep-setting the loss is less, often as little as 0.2 per cent. The separator, a mechanical device employing the principle of centrifugal force as a separating means, has reduced the loss of fat in the skim milk to a minimum, from 0.05 to 0.1 per cent. The centrifugal force of the separator is a thousand-fold greater than the force of gravity. The system of separation is continuous, a uniform flow of milk being conducted in a bowl or drum making from 5000 to 9000 revolutions a minute. Various sized machines are on the market, those worked by hand separating from 200 to 500 pounds of milk per hour, and power machines of 2000 pounds and over capacity.

The cream is churned sweet, or else "ripened" or soured, the object in the latter case being to develop certain flavors in the butter and also to aid in the process of churning. Ripening is due to the action of certain bacteria either present in the atmosphere or artificially introduced. Churning results in the rupture of the fat globules and their union in a mass separate from the buttermilk which is drawn off when the churning is completed; the butter is then washed, worked to remove buttermilk and water, salted and packed. The composition of butter varies, but is approximately: Fat, 85 per cent.; protein, 1 per cent.; ash (salt), 3 per cent.; water, 11 per cent. The food standard, given out by the U. S. Department of Agriculture requires not less than 82.5 per cent. of butter fat in butter. The quality depends upon the feed given the cows, their stage of lactation, the care of the milk, etc.

But'terbur (*Petasites vulgaris*), a composite plant, with large rhubarb-like leaves and purplish flowers, growing by the side of streams; allied to colt's-foot.

Buttercup (but'ér-cup), the popular name of two or three species of the *Ranunculus*, namely, *R. acris*, *R. bulbosus*, and *R. repens*. They are

common plants with brilliant yellow flowers.

Butterfly (but'ér-flī), the common name of all diurnal lepidopterous insects, corresponding to the original Linnæan genus *Papilio*. The family of the butterflies or diurnal Lepidoptera (so called to distinguish them from nocturnal or crepuscular Lepidoptera, such as moths) is a very extensive one, and naturalists differ much as to the manner of subdividing it. One of the most remarkable and interesting circumstances connected with these beautiful insects is their series of transformations before reaching a perfect state. The female butterfly lays a great quantity of eggs, which produce larvæ, commonly called caterpillars. After a short life these assume a new form, and become chrysalids or pupæ. These chrysalids are attached to other bodies in various ways, and are of various forms; they often have brilliant golden or argentine spots. Within its covering the insect develops, to emerge as the active and brilliant butterfly. These insects in their perfect form suck the nectar of plants, but take little food, and are all believed to be short-lived, their work in the perfect state being almost confined to the propagation of the species. Butterflies vary greatly in size and coloring, but most of them are very beautiful. The largest are found in tropical countries, where some measure nearly a foot across the wings. They may generally be distinguished from moths by having their wings erect when sitting, the moths having theirs horizontal. Some of them have great powers of flight. Among the most remarkable butterflies are those that present an extraordinary likeness to other objects—leaves, green or withered, flowers, bark, etc., a feature that serves greatly to protect them from enemies. See *Lepidoptera* and *Mimicry*.

Butterfly-fish. See *Blenny*.

Butterfly-weed, *Asclepias tuberosa* (see *Asclepias*), the pleurisy-root of America, where it has a considerable reputation as an article of the materia medica. It is an expectorant, a mild cathartic, and a diaphoretic, and is employed in incipient pulmonary affections, rheumatism, and dysentery.

Butterine (but'ér-in), an artificial butter, prepared from beef suet, milk, butter, and vegetable oil, and now largely made in the United States, Holland, etc. By the use of coloring matters it can be made to resemble butter of any given brand; but although quite wholesome when well made, it has

Buttermilk

not the delicate flavor and aroma of the highest-class butters. To prevent fraudulent sales Congress has passed a law requiring under penalty that every package containing artificial butter shall be duly marked, and that retail dealers shall not sell except from the original package.

Buttermilk, the milk from which butter has been extracted, forming a nutritious and agreeable cooling beverage with an acidulous taste.

Butternut, the fruit of *Juglans cinerea*, or white walnut, an American tree, so called from the oil it contains. The tree bears a resemblance in its general appearance to the black walnut, but the wood is not so dark in color. The same name is given to the nut of *Caryocar butyraceum* and *O. nuciferum* of South America, also known as *Suawarrow* or *Suawarra nut*.

Butter-tree, a name of several trees yielding oily or fatty substances somewhat resembling butter. See *Bassia*, *Shea*.

Butterwort, *Pinguicula vulgaris*, order Lentibulariaceae, a plant growing in bogs or soft grounds in Europe, Canada, &c. The leaves are covered with soft pellucid, glandular hairs, which secrete a glutinous liquor that catches small insects. The edges of the leaf roll over to retain the insect and the juice of the insect thus retained serve as food for the plant. In the north of Sweden the leaves are employed to curdle milk.

Buttmann (but'man), PHILIP KARL, German philologist, born in 1764. He spent most of his life at Berlin, where he taught in the Joachimsthal University. His best-known works are his *Greek Grammar* and *Lexilogus for Homer and Hesiod*. He died in 1829.

Buttons (but-uns), catches used to fasten together the different parts of dress, are of almost all forms and materials—wood, horn, bone, ivory, steel, copper, silver, brass, etc.—which are either left naked or covered with silk or some other material. The material of buttons has varied much with times and fashions. In the last century gilt, brass, or copper buttons were almost universal. Birmingham, England, was the great seat of manufacture, as it yet is of metallic and other buttons. The introduction of cloth-covered buttons early in the last century made a great revolution in the trade, and led to great varieties in the style of making up. The metal buttons now used are commonly made of brass or a mixture of tin and

brass. They are usually made from sheets of metal by punching and stamp-

ing. Such buttons are generally used for trousers. A substance now very commonly used for buttons is vegetable ivory (seeds of the ivory-nut palm), which may be colored according to pleasure. Mother-of-pearl buttons are another common kind. Of late years the making of porcelain buttons has developed into a remarkable industry. These buttons are both strong and cheap. Besides these kinds there are also glass buttons, made by softening the glass by heat and pressing it into a mold; buttons of vulcanite, marble, and many other materials; but these are fancy articles in the trade.

Buttresses (but'res-es), in architecture, especially Gothic, projections on the outside of the walls of an edifice, extending from the bottom to the top, or nearly, and intended to give additional support to the walls and prevent them from spreading under the weight of the roof. *Flying buttresses*, of a somewhat arched form, often spring from the top of the ordinary buttresses, leaning inwards so as to abut against and support a higher portion of the building, such as the wall of a clerestory, thus receiving part of the pressure from the weight of the roof of the central pile.



Flying Buttress, St. Ouen.



Buttress and Flying Buttress.

Buttonwood (but'un-wôd), the name usually given to the American plane tree, so called from the small, round balls it produces as seed vessels (*Platanus occidentalis*).

Butyric Acid (bû-tir'ik), an acid obtained from butter; it also occurs in perspiration, codliver oil, etc. Butyric acid is a colorless liquid, having a smell like that of rancid butter; its taste is acrid and biting, with a sweetish after-taste.

Butyr'ic Ether, a substance obtained from butyric acid, having the flavor of pineapples, used in flavoring confectionery, as an ingredient in perfumes, etc.

Buxar', or BAXAR', a town of Bengal, on the Ganges, 350 miles N. W. of Calcutta. The Hindus regard it as a very sacred place. Pop. 16,498.

Buxton (bux'ton), a town in the county of Derby, England, situated in a valley celebrated for its mineral waters, being largely visited for the purpose of drinking these waters. The surrounding scenery is fine, and there is a great stalactite cavern called Toole's Hole in the neighborhood. Pop. (1911) 10,025.

Buxton, SIR THOMAS FOWELL, an English philanthropist, born in 1786, and educated at Trinity College, Dublin. In 1811 he joined the firm of the celebrated brewers, Truman, Hanbury, & Co., and took an active share in the business. The Spitalfields distress in 1816 was the occasion of his turning his attention to philanthropic efforts, and along with his sister-in-law, the celebrated Mrs. Fry, he made inquiries which directed public attention to the system of prison discipline. In 1818 he was elected M.P. for Weymouth, and was long the able condjutor of Wilberforce in his efforts for the abolition of slavery. He was created a baronet in 1840 and died in 1845.

Buxtorf (bux'torf), JOHANN, a German orientalist, was born in 1564, and became professor at Basel, where he died in 1629. His chief work is *Lexicon Chaldaicum Talmudicum et Rabbinicum*. His son Johann, born at Basel, was equally eminent as a Hebrew scholar, and succeeded to his father's chair. He died in 1664.

Bux'us. See *Bos-tree*.

Buyuk'dere (bû-yûk'dâ a), a town on the Bosphorus, 10 miles from Constantinople. It is famous for its scenery, and is a favorite residence of the Christian ambassadors.

Buzzard (buz'ard), the name or rap-torial birds which form one of the subfamilies of the diurnal birds of prey; characters, a moderate-sized beak, hooked from the base, long wings, long tarsi, and short weak toes. The common buzzard (*Buteo vulgaris*) is distributed over the whole of Europe as well as the north of Africa and Western Asia. Its food is very miscellaneous, and consists of moles, mice, frogs, toads, worms, insects, etc. It is sluggish in its habits. Its length is from 20 to 22 inches. The rough-legged buzzard (*B. lagopus*), so called from having its legs feathered to the toes, is a native of Britain. Its habits resemble those of the common buzzard. The red-tailed hawk of the United States is a buzzard (*B. borealis*). It is also called hen-hawk, from its raids on the poultry-yard. The genus *Pernis*, to which the honey-buzzard (*P. apivorus*) belongs, has the beak rather weaker than *Buteo*, but does not differ much from that genus. The honey-buzzard is so called because feeding specially on bees and wasps. The turkey buzzard, so common in the Southern United States, where it is esteemed and protected as a destroyer of carrion, is not a true buzzard, but a vulture, belonging to the genus *Catharista*, of the family *Vulturidae*.

Byblos (bib'los), an ancient maritime city of Phœnicia, now called Jebail, a little north of Beyrout. It was the chief seat of the worship of Adonis or Thammuz.

By-law, BYE-LAW (from the Scand. *by*, a town), a law made by an incorporated or other body for the regulation of its own affairs, or the affairs intrusted to its care. Town-councils, railway companies, and chartered societies of all kinds, etc., enact by-laws which are binding upon all coming within the sphere of the operations of such bodies. By-laws must of course be within the meaning of the charter of incorporation and in accordance with the law of the land.

Byng, SIR JULIAN K. G., born in 1862, a younger son of the Earl of Stratford. He joined the Royal Hussars in 1882, gradually advanced in rank, was made major-general in 1909, and reached the rank of lieutenant-general in the European war. He served in the Dardanelles campaign, and in November, 1917, commanded the highly successful surprise attack on the German lines before Cambrai, carried out with the aid of 'tanks.'

Byrom (bi'rom), JOHN, an English poet and stenographer, born in 1692; died in 1763. He was educated at Merchant Taylors' School and Trinity College, Cambridge, and for some time

studied medicine, but his chief means of livelihood for many years till he inherited the family estates in 1740, was teaching shorthand on a system invented by himself. He was on friendly terms with many of the eminent men of his time. His earliest writings were a few papers to the *Spectator*; his poems (collected in 1773) were chiefly humorous and satirical, and show remarkable facility in rhyming.

Byron (bi'ron), GEORGE GORDON NOEL, LORD BYRON, a great English poet, was born in Holles Street, London, in 1788. He was the grandson of Admiral John Byron, and son of the admiral's only son, Captain John Byron, of the Guards, so notorious for his gallantries and reckless dissipation that he was known as 'Mad Jack Byron.' His mother was Catherine Gordon, of Gight, who was left a widow in the year 1701.



Lord Byron.

Till the age of seven he was entirely under the care of his mother, and to her injudicious indulgence the waywardness that marked his after career has been partly attributed. On reaching his seventh year he was sent to the grammar-school at Aberdeen, and four years after, in 1798, the death of his grand-uncle gave him the titles and estates of the family. Mother and son then removed to Newstead Abbey, the family seat, near Nottingham. Soon after Byron was sent to Harrow, where he distinguished himself by his love of manly sports and his undaunted spirit. While at school he fell deeply in love with Miss Chaworth, a distant cousin of his own. But the lady slighted the homage of the Harrow school-boy, her junior by two years, and married

another and more mature suitor. In *The Dream* Byron alludes finely to their parting interview. In 1805 he was entered at Trinity College, Cambridge. Two years after, in 1807, appeared his first poetic volume, *Hours of Idleness*, which, though indeed containing nothing of much merit, was castigated with overseverity by Brougham in the *Edinburgh Review*. This caustic critique roused the slumbering energy in Byron, and drew from him his first really notable effort, the celebrated satire *English Bards and Scotch Reviewers*. In 1809, in company with a friend, he visited the southern provinces of Spain, and voyaged along the shores of the Mediterranean. The fruit of these travels was the fine poem of *Childe Harold's Pilgrimage*, the first two cantos of which were published on his return in 1812. The poem was an immense success, and Byron 'awoke one morning and found himself famous.' His acquaintance was now much courted, and his first entry on the stage of public life may be dated from this era. During the next two years (1813-14) the *Giaour*, the *Bride of Abydos*, the *Corsair*, *Lara*, and the *Siege of Corinth* showed the brilliant work of which the new poet was capable. In 1815 Byron married Anna Isabella, only daughter of Sir Ralph Milbanke, but the marriage proved unfortunate, and in about a year Lady Byron, who had gone on a visit to her parents, refused to return, and a formal separation took place. This rupture produced a considerable sensation, and the real cause of it has never been satisfactorily explained. It gave rise to much popular indignation against Byron, who left England, with an expressed resolution never to return. He visited France, the field of Waterloo and Brussels, the Rhine, Switzerland, and the north of Italy, and for some time took up his abode at Venice, and later at Rome, where he completed his third canto of *Childe Harold*. Not long after appeared the *Prisoner of Chillon*, *The Dream* and other Poems; and in 1817 *Manfred*, a tragedy, and the *Lament of Tasso*. From Italy he made occasional excursions to the islands of Greece, and at length visited Athens, where he sketched many of the scenes of the fourth and last canto of *Childe Harold*. In 1819 was published the romantic tale of *Mazeppa*, and the same year was marked by the commencement of *Don Juan*. In 1820 appeared *Marino Faliero*, *Doge of Venice*, a tragedy; the drama of *Sardanapalus*; the *Two Foscari*, a tragedy; and *Cain*, a mystery. After leaving Venice Byron resided for some time at Ravenna, then at

Pisa, and lastly at Genoa. At Ravenna he became intimate with the Countess Guiccioli, a married lady; and when he removed to Pisa, in 1822, she followed him. There he continued to occupy himself with literature and poetry, sustained for a time by the companionship of Shelley, one of the few men whom he entirely respected and with whom he was quite confidential. Besides his contributions in the *Liberal*, a periodical established at this time in conjunction with Leigh Hunt and Shelley, he completed the later cantos of *Don Juan*, with *Werner*, a tragedy, and the *Deformed Transformed*, a fragment. These are the last of Byron's poetical efforts. In 1823, troubled perhaps by the consciousness that his life had too long been unworthy of him, he conceived the idea of throwing himself into the struggle for the independence of Greece. In January, 1824, he arrived at Missolonghi, was received with the greatest enthusiasm, and immediately took into his pay a body of 500 Suliotes. The disorderly temper of these troops, and the difficulties of his situation, together with the malarious air of Missolonghi, began to affect his health. On the 9th April, 1824, while riding out in the rain, he caught a fever, which ten days later ended fatally. Thus, in his thirty-seventh year died prematurely a man whose natural force and genius were perhaps superior to those of any Englishman of his time, and, largely undisciplined as they were, and wasted by an irregular life, they acquired for him a name second, in the opinion of continental Europe at least, to that of no other Englishman of his time. The body of Byron was taken to England and interred in Hucknall-Torkard church, Notts.

Byron, HENRY JAMES, an English dramatist and actor, born in 1834; died in 1884. He wrote an immense number of pieces, including a great many farces, burlesques, and extravaganzas, besides comedies or domestic dramas, such as *Cyril's Success*; *Dearer than Life*; *Blow for Blow*; *Uncle Dick's Darling*; *the Prompter's Box*; *Partners for Life*; and *Our Boys*, the last having an extraordinary success.

Byron, JOHN, an English admiral, grandfather of the poet Lord Byron, was born in 1723. Embarking as midshipman in one of the ships of Lord Anson, which was wrecked on the Pacific coast (1741), north of the Straits of Magellan, he published a narrative of his adventures amongst the Indians

which is extremely interesting. In 1758 he commanded three ships of the line and distinguished himself in the war against France. In June, 1764, he set out in a frigate to circumnavigate the globe, returning to England in May, 1766. From 1769 to 1775 he was governor of Newfoundland. He was made vice-admiral of the white in 1779, and died in 1786.

Byssus (bis'us), a name given to the hair or threadlike substance (called also *beard*), with which the different kinds of sea-mussels fasten themselves to the rocks. The *Pinna nobilis*, particularly, is distinguished by the length and the silky fineness of its beard, from which cloths, gloves, and stockings are still manufactured (mainly as curiosities) in Sicily and Calabria.

Byttneriaceæ (bit-ner-i-a'-se-e), a natural order of plants allied to the mallows. Almost all the species contain a fatty oil in their seeds, and have a fibrous bast. The typical genus is *Byttneria*, from which the order is named, but by far the most important is *Theobroma* to which the tree yielding cocoa (cacao) belongs.

Byzantine (bi-zan'tin, bi-z'a-n-tin), ART, a style which arose in Southeastern Europe after Constantinople.



Byzantine Architecture.—Ancient Cathedral, Athens.

the Great had made Byzantium the capital of the Roman Empire (330 A.D.) and ornamented that city, which was called after him, with all the treasures of Grecian art. (See *Byzantine Empire*). One of the chief influences of Byzantine art was Christianity, and to a certain extent Byzantine art may be

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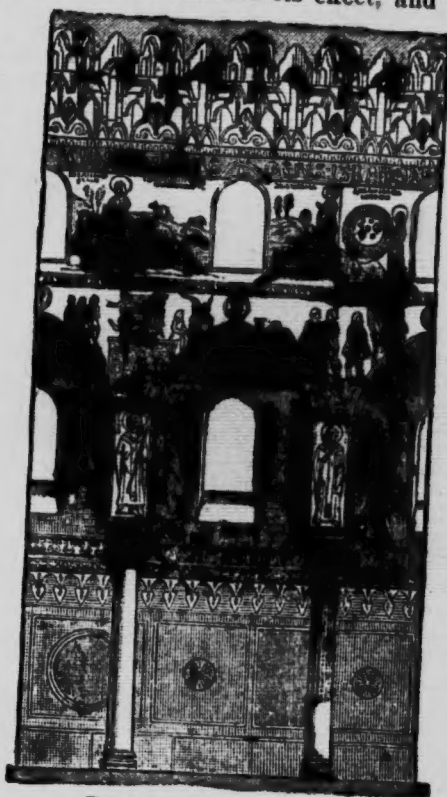
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ognized as the endeavor to give expression to the new elements which Christianity had brought into the life of men. The tendency towards Oriental luxuriance and splendor of ornament now quite supplanted the simplicity of ancient taste. Richness of material and decoration was the aim of the artist rather than purity of conception. Yet the classical ideals of art, and in particular the traditions of technical processes and methods carried to Byzantium by the artists of the Western Empire, held their ground long enough, and produced work pure and powerful enough, to kindle the new artistic life which began in Italy with Cimabue and Giotto.

With regard to *sculpture* the statues no longer displayed the freedom and dignity of ancient art. The true proportion of parts, the correctness of the outlines, and in general the severe beauty of the naked figure, or of simple drapery in Greek art, were neglected for extravagant costume and ornamentation and petty details. Yet in the best period of Byzantine art, from the 6th to the 11th century, there is considerable spiritual dignity in the general conception of the figures. But sculpture was of second-rate importance at Byzantium, the taste of those times inclining more to mosaic work with the costliness and brilliant colors of its stones. The first germ of a Christian style of art was developed in the Byzantine pictures. The artists, who appear to have seldom employed the living model, and had nothing real and material before them, but were obliged to find, in their own imaginations, conceptions of the external appearance of sacred persons, such as the mother of Christ or the apostles, could give but feeble renderings of their ideas. As they cared but little for a faithful imitation of nature, but were satisfied with repeating what was once acknowledged as successful, it is not strange that certain forms, approved by the taste of the time, should be made, by convention, and without regard to truth and beauty, general models of the human figure, and be transmitted as such to succeeding times. In this way the artists in the later periods did not even aim at accuracy of representation, but were contented with stiff general outlines, lavishing their labor on ornamental parts.

Byzantine architecture may be said to have assumed its distinctive features in the Church of St. Sophia built by Justinian in the sixth century, and still existing as the chief mosque in Constantinople. It is more especially the style associated with the Greek Church as distinguished from the Roman. The leading forms of

the Byzantine style are the round arch, the circle, and in particular the dome. The last is the most conspicuous and characteristic object in Byzantine buildings, and the free and full employment of it was arrived at when by the use of pendentives the architects were enabled to place it on a square apartment instead of a circular or polygonal. In this style of building the incrustation of brick with more precious materials was largely in use. It depended much on color and surface ornament for its effect, and with



BYZANTINE ARCHITECTURE.
Part of the Nave of the Palatine chapel,
Palermo.

this intent mosaics wrought on ground of gold or of positive color are profusely introduced, while colored marbles and stones of various kinds are greatly made use of. The capitals are of peculiar and original design, the most characteristic being square and tapering downwards, and they are very varied in their decorations. Byzantine architecture may be divided into an older and a newer (or Neo-Byzantine) style. The most distinctive feature of the latter is that the dome is raised on a perpendicular circular or polygonal piece of masonry (technically the *drum*)

containing windows for lighting the interior, while in the older style the light was admitted by openings in the dome itself. The Cathedral of Athens (shown in the accompanying cut) is an example of the Neo-Byzantine style. The Byzantine style had a great influence on the architecture of Western Europe, especially in Italy, where St. Mark's in Venice is a magnificent example, as also in Sicily. It had also material influence in Southern France and Western Germany.

Byzantine EMPIRE, the Eastern Roman Empire, so called from its capital Byzantium or Constantinople. The Byzantine Empire was founded in A.D. 395, when Theodosius at his death divided the Roman Empire between his sons Arcadius and Honorius. In this empire the Greek language and civilization were prevalent; but the rulers claimed still to be Roman emperors, and under their sway the laws and official forms of Rome were maintained. It lasted for about a thousand years after the downfall of the Western Empire. It is also known as the *Greek Empire* or *Lower Empire*. Its capital was naturally Constantinople, a city established by Constantine in 330 on the site of the ancient Byzantium as the new capital of the whole Roman Empire.

The Eastern Empire, then comprising Asia Minor, Syria, Egypt, Greece, Thrace, Moesia, Macedonia, and Crete, fell to Theodosius's elder son Arcadius, through whose weakness and that of several of his immediate successors it suffered severely from the encroachments of Huns, Goths, Bulgarians, and Persians. In 527 the celebrated Justinian succeeded, whose reign is famous for the codification of Roman law, and the victories of his generals Belisarius and Narses over the Vandals in Africa, and the Goths in Italy, which was henceforth governed for the Eastern Empire by an *exarch* residing at Ravenna. But his energy could not revive the decaying strength of the empire, and Justin II, his successor (565-578), a weak and avaricious prince, lost his reason by the reverses encountered in his conflicts with plundering Lombards, Avars, and Persians. Tiberius, a captain of the guard, succeeded in 578, and in 582 Mauricius; both were men of ability. In 602 Phocas, proclaimed emperor by the army, succeeded, and produced by his incapacity the greatest disorder in the empire. Heraclius, son of the governor of Africa, who headed a conspiracy, conquered Constantinople, and caused Phocas to be executed (610). He was an excel-

lent general, and finally succeeded in repelling the Avars and recovering the provinces lost to the Persians, whose power indeed he overthrew. But a far more dangerous enemy to the Byzantine empire now appeared in the Moslem power, founded amongst the Arabians by Mohammed and the caliphs, which gradually extended its conquests over Phoenicia, the countries on the Euphrates, Judea, Syria, and Egypt (635-641). In 641 Heraclius died, nor was there among his descendants a single prince capable of stemming the tide of Moslem invasion. The Arabians took part of Africa, Cyprus, and Rhodes (653), inundated Africa and Sicily, penetrated into Thrace, and attacked Constantinople by sea.

The empire was in sore straits when Leo the Isaurian (Leo III), general of the army of the East, mounted the throne (716), and a new period of comparative prosperity began. Some writers date the beginning of the Byzantine Empire proper, and the end of the Eastern Roman Empire, from this era. Numerous reforms, civil and military, were now introduced, and the worship of images was prohibited. Leo repelled the Arabians and Saracens from Constantinople, but allowed the Lombards to seize the Italian provinces, while the Arabians plundered the Eastern ones. Constantine V (741) recovered part of Syria and Armenia from the Arabians; and the struggle was carried on not unsuccessfully by his son Leo IV. Under his grandson, Constantine VI, Irene, the ambitious mother of the latter, raised a large faction by the restoration of image worship, and, in conjunction with her paramour Stauricius, deposed her son, and had his eyes put out (797). A revolt of the patricians placed one of their order, Nicephorus, on the throne, who fell in a war against the Bulgarians (811). Stauricius, Michael, Leo V and Michael (820) ascended the throne in rapid succession. During the reign of the latter the Arabians conquered Sicily, Lower Italy, Crete, and other countries. The long dispute as to image-worship was brought to a close in 842, when the practice was finally sanctioned at the council of Nicaea, under Michael III. He was put to death by Basil the Macedonian, who came to the throne as Basil I (867), and whose reign formed a period of great glory in the history of the Byzantine Empire. He founded a dynasty (the *Macedonian*) which lasted till 1057. Among the greatest of his successors were Nicephorus II (Phocas), and John Comnenus (969), who carried on successful

Byzantine

Byzantium

wars against the Mohammedans, Bulgarians, and Russians. Basil II succeeded this prince (976). He vanquished the Bulgarians and the Arabians. His brother, Constantine IX (1025), was succeeded by Romanus III (1028), who married Zoe, daughter of Constantine. This dissolute but able princess caused her husband to be executed, and successively raised to the throne Michael IV (1034), Michael V (1041), and Constantine X (1042). Russians and Mohammedans meanwhile devastated the empire. Her sister Theodora succeeded her on the throne (1054).

After the short reign of Michael VI (1054-57) Isaac Comnenus, the first of the Comnenian dynasty, ascended the throne, but soon after became a monk. The three chief emperors of this dynasty were Alexius, John, and Manuel Comnenus. During the reign of Alexius I (1081-1118) the Crusades commenced. His son, John II, and grandson, Manuel I, fought with success against the Turks, whose progress also was considerably checked by the Crusades. The Latins, the name given to the French, Venetian, etc., crusaders, now forced their way to Constantinople (1204), conquered the city, and retained it, together with most of the European territories of the empire. Baldwin, count of Flanders, was made emperor; Boniface, marquis of Montferat, obtained Thessalonica as a kingdom, and the Venetians acquired a large extent of territory. Theodore Lascaris seized on the Asiatic provinces, in 1206 made Nice (Nicæa), the capital of the empire, and was at first more powerful than Baldwin. Neither Baldwin nor his successors, Henry, Peter, and Robert of Courtenay, were able to secure the tottering throne. John, emperor of Nice, conquered all the remaining Byzantine territory except Constantinople, and at last, in 1261, Michael Palæologus, King of Nice, conquered Constantinople, and thus overthrew the Latin dynasty.

Thus again the vast but exhausted Byzantine Empire was united under

Michael Palæologus, founder of the last Byzantine dynasty. Internal troubles and wars with the Turks disturbed the reigns of his descendants, Andronicus II and Andronicus III. For a time the Cantacuzenes shared the crown with John Palæologus, son of Andronicus III; but in 1355 John again became sole emperor. In his reign the Turks first obtained a firm footing in Europe, and conquered Gallipoli (1357). In 1361 Sultan Amurath took Adrianople. Bajazet conquered almost all the European provinces except Constantinople, and was pressing it hard when Timur's invasion of the Turkish provinces saved Constantinople for this time (1402). Manuel, then emperor, recovered his throne, and regained some of the lost provinces from the contending sons of Bajazet. To him succeeded his son John Palæologus II (1425), whom Amurath II stripped of all his territories except Constantinople, and laid under tribute (1444). To the Emperor John succeeded his brother Constantine Palæologus. With the assistance of his general Giustiniani, a Genoese, he withstood the superior forces of the enemy with fruitless courage, and fell in the defense of Constantinople, by the conquest of which (May 29, 1453) Mohammed II put an end to the Greek or Byzantine Empire. The Byzantine Empire which thus lasted for over a thousand years, was of immense service to the world in stemming the tide of Mohammedan advance, in extending Christianity and civilization, and in maintaining a regular system of government, law, and policy in the midst of surrounding barbarism.

Byzantium (bi-zan'ti-um), the original name of the city of Constantinople. It was founded by Greek colonists in 658 B.C., and owing to its favorable position for commerce it attained great prosperity, and survived the decay of most of the other Greek cities. In A.D. 330 a new era began for it when Constantine the Great made it the capital of the Roman Empire. See *Constantinople*.